# Southern Power & Industry

The Industrial and Power Journal of the Soutl outhwest

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APRIL 1959

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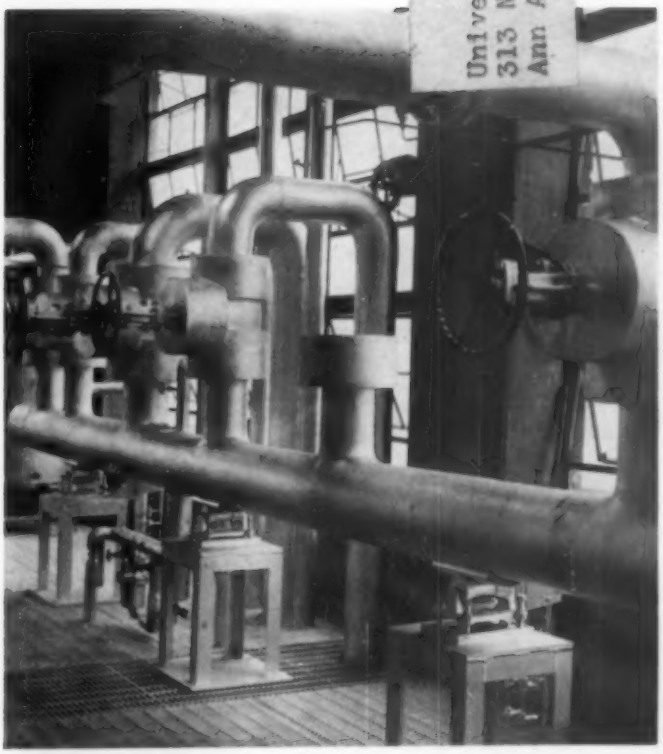

**THE DESIGN** of a small industrial steam plant merits the same careful analysis and attention to detail normally accorded large plants costing millions of dollars.

**THIRTEEN STEPS** in planning that add little to cost and greatly improve performance are presented by an authority in the industrial field. — P. 36

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Volume 77 Number 4

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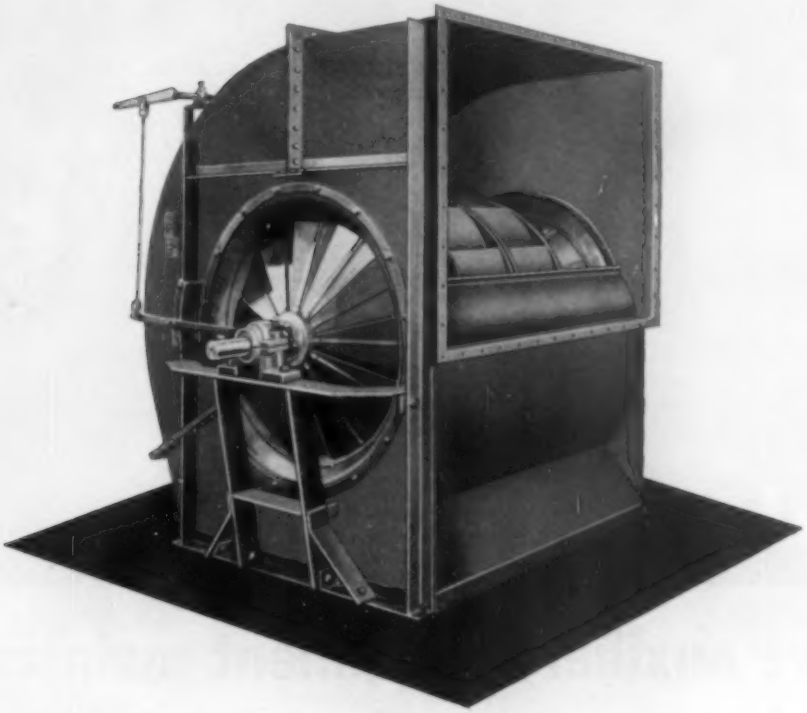

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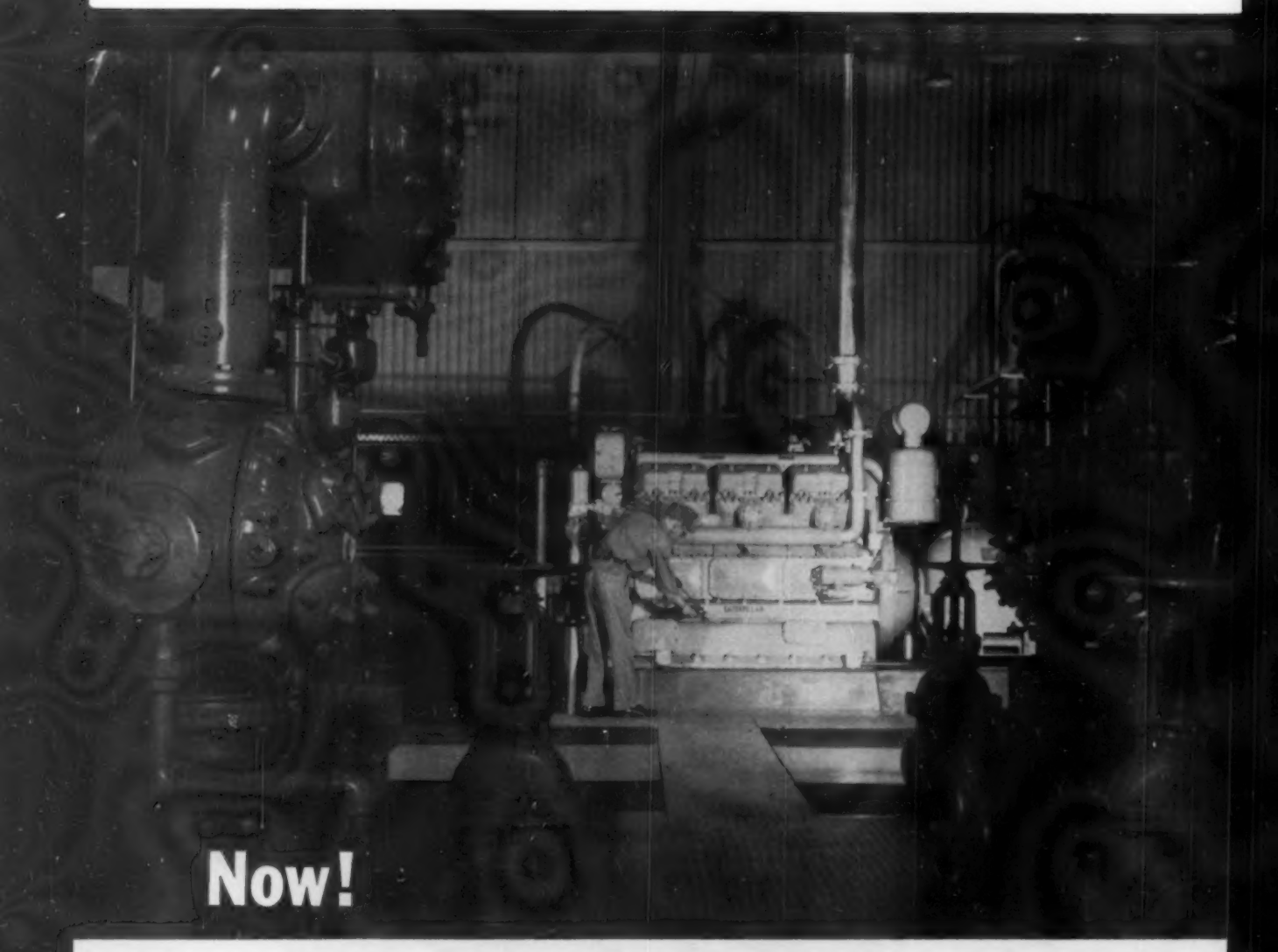


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# Facts and Trends

April 1, 1959

◆ ONE PLANT MANAGER has developed a sly but effective technique. Fast film and a good lens make it possible for him to snap "available light" pictures as he makes his rounds in the plant. Nobody knows what's happened until they see the photos on the bulletin board.

The article on photography mentioned in this spot last month proved too big for us. So, we chopped it in two. The first half is in this issue. Next section will show how photography aids plant training.

◆ A GAS TURBINE in a Louisiana Municipal Power Plant quickly supplied urgently needed capacity. And better still, the overall plant efficiency will be boosted 10% when it is properly combined with steam units as planned. Watch for the complete story in a month or so.

◆ MANY SPI READERS will be reading their own contributions in our MAY MAINTENANCE issue. That should stop complaints before they start.

Seriously, our engineering friends in Southern plants have been most cooperative and material for an excellent MAINTENANCE issue is already in the top drawer. Take a good look at the May issue when it comes out and you will see by-lines that you recognize and respect.

◆ EMPLOYMENT represents 75 to 80% of all costs in the production of goods and services according to Conrad Cooper, V. P. of U. S. Steel. That's why many U. S. producers are feeling the pinch from foreign competition. Our good old high pay works against us when too much foreign equipment is bought by our own industries or government.

Mr. Cooper said, "In 1951, only three per cent of all barbed wire sold in this country came from overseas. By 1957, no less than 52% came from foreign countries.

The General Electric Co. has petitioned the Office of Civil & Defense Mobilization to hold up the recent purchase of a 500,000 kilowatt steam turbine-generator unit by the Tennessee Valley Authority from a British manufacturer, and immediately institute a study to determine the detrimental effects such purchases have on the national security.

◆ A NEW MEMBRANE permeation process for separating liquid mixtures promises to be simpler and more economical than many processes now used for difficult liquid separations.

The new process, developed in American Oil Co.'s research and development laboratories in Texas City, Tex., uses a thin, nonporous membrane to separate a given component from a liquid mixture. The mixture is fed as a liquid into one side of a heated vessel divided into two compartments by the membrane. The component to be separated dissolves in the membrane, dif-

# New ALLEN-BRADLEY OILTIGHT PRESSURE SWITCHES

**Bulletin 836 Type T**

Both operating pressure and differential are adjustable on these new A-B oiltight pressure switches. Operating pressure is externally adjustable, and setting shows on calibrated scale. A trip indicator shows operating point.

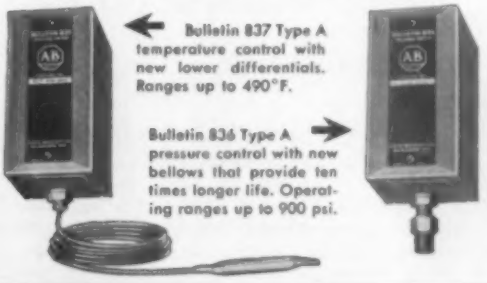
## For machine tool hydraulic systems—operating at pressures up to 5,000 psi

Especially designed for heavy duty industrial applications, these new Allen-Bradley oiltight high pressure switches assure long, trouble free life. The attractive die-cast aluminum enclosure is completely sealed to exclude oil and water. The snap-action switch mechanism maintains its high contact pressure to the point of switchover—no matter how slowly it is approached. Contact chatter is eliminated—trouble free contact life is increased. The contact block has two isolated circuits with one N.O. and one N.C. set of contacts.

Send for complete information on this newest addition to Allen-Bradley's wide line of *quality* pilot controls.

Internal view of piston design used on units for systems above 500 psi. Bellows type construction is used up to 500 psi.

**Also . . . A New Line of Pressure and Temperature Controls with Lower Differentials**



Bulletin 837 Type A temperature control with new lower differentials. Ranges up to 490°F.

Bulletin 836 Type A pressure control with new bellows that provide ten times longer life. Operating ranges up to 900 psi.

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# Facts and Trends (Continued)

fuses through it and emerges as a vapor in the second compartment. The membrane contains no holes or pores and the process is not a sieving action in any way.

- NOW IF WE COULD GET paint in rugged flexible synthetic bags with a closable discharge nipple, we could push the bag around for proper mixing and then squeeze out the amount needed for small jobs. The remainder would be ready for a future job—no messy compression top cans.

- TELEVISION SYSTEMS designed and priced to stimulate greater use in business and industry have been announced. The unit will be priced well below most custom-designed systems currently on the market.

- THE CHANGING NATURE of defense industry is reflected by less airframe fabrication and assembly work and a greater share of the defense dollar going into electronics and missiles. Temco Aircraft at Dallas has expanded quickly into these prime fields under a master plan developed in 1956 and they are ahead of their schedule which calls for more than half of their sales to be in the new category by the end of 1961.

- FLEXIBLE HOSE, which can be used for short periods at 600 F, lasts almost indefinitely at 350 F, and resists extremes of chemical attack, is now being marketed.

  The hose is a result of new technology working with "Viton" synthetic rubber. The development makes possible extrusion and fabrication of large diameter hose from Du Pont's new heat and fluid resistant elastomer.

- A $21,290,000 construction budget was approved by the Board of Tampa Electric Co. The majority of these construction funds will go into a new generating unit for the company's coal-fired Gannon Plant. This 175,000 kw unit is slated for completion in the fall of 1960. This will give the company a total of 735,000 kw capacity at that time.

- GEARCHEM pumps, with flows up to 10 gpm made from the zirconium alloy containing 2.5 hafnium are now being offered.

  Eco's pioneering of zirconium in a commercially-priced, mass-produced pump for standard process services requiring resistance to such hot corrosives as HCl at temperatures up to 300 F. is believed to be the first commercialization of this nuclear development for the benefit of pump users at large.

- ERIC, a non-person, will soon be guiding two driverless tractor trailers for British Railways. The tractors—Robotugs—will go into service in April fitted with ERIC (Electronic Remote and Independent Control) to enable them to trundle about pulling heavy loads entirely unattended by a driver.

- TITANIUM—a comprehensive brochure has been published by Harvey Aluminum. The 36-page booklet is intended as a reference for engineers, metallurgists, and designers who want the latest information available on titanium.

Write the editors for additional information on any of the above items. SOUTHERN POWER & INDUSTRY. 806 Peachtree St., N.E. Atlanta 8, Ga.

# Problem: PRODUCTION CHANGE REQUIRED IMMEDIATE DELIVERY OF SPECIAL ALUMINUM SHEETS

# *Solution:*

**RECENTLY,** the Swartzbaugh Manufacturing Company of Murfreesboro, Tennessee made plans to produce an improved design of their Mealmobile. Swartzbaugh manufactures a variety of industrial carts for industry, institutions and branches of the Federal government. The Ideal Mealmobile which this company manufactures is a portable, heat-controlled, mechanically refrigerated food and drink unit. It has removable food trays constructed of lightweight, corrosion resistant aluminum. To make these trays Swartzbaugh needed special aluminum sheets.

**MR. ROBERT WILLIS,** purchasing agent of Swartzbaugh, shown pointing out the materials used to Mr. William Conklin, general sales manager, called our Nashville plant in an effort to line up the materials and delivery by production time the next morning. The special sheets needed are not normally stocked by aluminum warehouses but our Mr. A. C. Hammond, Nashville branch manager, turned to his wide range of types, gauges, widths and lengths of aluminum and came up with the sheets in stock, to fill the exact requirements of our customer.

**MR. A. C. HAMMOND** found, however, that making delivery for the following morning presented a problem. After getting the needed materials together he found that all of the Nashville branch trucks were on the road with scheduled deliveries that could not be interrupted. He quickly made arrangements with one of the local truck leasing companies to get a truck, with the result that the delivery of the urgently needed materials was accomplished the same afternoon the order was placed.

**MR. JOHN D. SWARTZBAUGH,** president of the company, has advised that the manufacturing schedule was maintained with no loss time incurred. This type of problem and an on-time solution is usual with our branch managers in their ten warehouses. With complete stocks of aluminum sheets, aluminum mill products, brass, copper and stainless on hand at all times such problems are solved quickly and satisfactorily. Call in your Reynolds Aluminum Supply Company representative—there are over 140 on the job at all times—and talk with him about your requirements. He may be able to contribute to your increased production and profits in 1959.

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## New Facilities for Crump — Richmond

**B. T. Crump Company, Inc.,** plans to move out of its old buildings just east of the Virginia State Capitol and into two new buildings costing almost a million dollars by July 1.

An $875,000 sewn textile plant under construction on a 16.4 acre tract in adjacent Henrico County is expected to be ready in late spring. The 127,000 square foot building will employ about 250 persons in manufacturing hassocks, seat covers, cushions, etc. The company's general offices will also be at this location.

## Continental Can — Mississippi & Texas

**Continental Can Company** is beginning construction of new can plants at Pascagoula, Mississippi, and Weslaco, Texas.

The Pascagoula plant, which will supply cans to Gulf Coast packers of shrimp, oysters and cat food, will occupy a 48,600 square foot building to be built on a site acquired by Continental last year.

The Weslaco plant, serving the fertile Rio Grande Valley, will make cans for citrus, green beans, tomato and pineapple packers. It will be housed in a 46,000 square foot building on an 8.4 acre site.

## Du Pont — Orange, Tex.

A plant to produce linear polyethylene by a low-pressure process is getting underway at Du Pont's Sabine River Works in Orange, Tex. with completion anticipated for mid-1960. The unit will provide jobs for about 50 additional operating employees.

Walter H. Salzenberg, general manager of Du Pont's Polychemicals Department, announced that the company will use a process developed under its own research program.

Also, in a program to investigate the polyethylene film field, the company is building a laboratory and pilot plant adjacent to its polyethylene resin facility to be ready for operation in the latter part of 1959.

## Carton Plant Gets New Facilities

Underway in Jacksonville, Florida is a 75,000 sq ft building which will house the **Rock City Box Sales Company.**

The plant will replace the company's present facilities in the manufacture of folding cartons.

## Du Pont Expansion at Memphis, Tenn.

Multimillion dollar sodium and chlorine unit at **Du Pont Company's** Memphis, Tenn., plant has been completed, increasing capacity by 50 per cent, according to T. D. Bell, manager of the plant.

Part of the additional chlorine capacity will be used in the manufacture of titanium dioxide pigment at Du Pont's new 45,000 ton capacity plant now nearing completion at New Johnsonville, Tenn. The plant will produce chloride type pigment by a process resulting from Du Pont's research program. Chlorine also is used in the manufacture of chlorinated solvents, such as perchlorethylene and trichlorethylene, and for many other industrial uses.

Two other major projects are nearing completion at the Memphis plant and should be in operation about midyear. These include a plant to produce "Oxone" monopersulfate compound and increased production facilities for hydrogen peroxide. The three projects have created about 200 new jobs at the plant, which also makes sodium cyanide and hydrogen cyanide.

## Solite Plant for Florida

**Southern Lightweight Aggregate Corporation,** Richmond, Va. has announced the opening of a new Solite production plant in Russell, Florida, just south of Jacksonville. It is the first plant to open under the newly incorporated **Florida Solite Corporation,** a wholly-owned subsidiary of Southern Lightweight Aggregate.

The plant will produce Solite, the lightweight aggregate manufactured by a controlled process and used in lightweight structural concrete and masonry units.

# Edward Valves Expands Service to Southern Industry

To serve the needs of industry in the Southeast, Edward Valves, Inc. of East Chicago, Indiana, (a subsidiary of Rockwell Manufacturing Company) has established a new sales office at 1495 Northside Drive, N.W., Atlanta.

The new office will provide sales and engineering service on Edward cast and forged steel valves for the states of Georgia, South Carolina and Florida (except ten westernmost counties). Lee A. Colbath, who has had broad factory and field experience with Edward, has been named District Manager for the new Atlanta Office.

## *A complete line of forged and cast steel valves*

Lee A. Colbath, new Southeast District Manager for Edward Valves, Inc.

**Edward Builds** . . . a complete line of forged and cast steel valves for pressures to 10,000 lb in pressure-seal, bolted, union or welded bonnet construction with flanged, screwed or welding ends and sizes from ¼ in. to 18 in. for power, petroleum, marine and other technological services. Included are: Globe and Angle Stop Valves—Gate Valves—Non-Return Valves—Check Valves—Blow-Off Valves—Feedline Stop-Check Valves—Relief Valves—Hydraulic Valves—Instrument Valves—Gage Valves—Mudwonder Valves—Strainers—Special Designs.

*Edward Valves, Inc.*
*East Chicago, Indiana*
*Subsidiary of Rockwell Manufacturing Company.*

EDWARD STEEL VALVES
another fine product by
ROCKWELL

## *News of the South-Southwest — more power . . . more plants . . . more money*

### Helium Plant Underway in Okla.

August completion is anticipated by the Fluor Corporation of Los Angeles, Calif., which is designing and building a Government helium plant for the Bureau of Mines. Approximately $12 million is available for constructing the plant. Basic plant costs under the contract are estimated at $8,900,000, with land and certain additions to the plant to be handled separately.

The plant will be constructed in the Keyes field of Cimarron County, Okla., where natural gas averages about two per cent helium. It will extract helium from natural gas produced at Keyes by the Colorado Interstate Gas Company under a contract signed by Colorado Interstate and the Bureau of Mines several months ago.

### $94.6 Million Dam for Ark. River Navigation

Plans are underway for the first stage of construction on **Dardanelle Lock and Dam** which will cost approximately $5,000,000. Being erected 2 miles upstream from Dardanelle, Ark., construction will include a cofferdam on the north bank of the river, excavation of the river bed, a 600-foot earth embankment section, and part of the lock walls. The lock walls to be constructed under the contract will be about 440 feet of the upstream end of the lock chamber.

This first unit of the Arkansas River navigation program to be undertaken in Arkansas will consist of a dam about 2,700 feet long, 90 feet high, and a navigation lock 110 feet wide and 600 feet long, which will provide a lift of 52 feet for barge traffic on the river when the navigation program is complete. On the south bank of the river will be located a powerhouse containing four 30,000 - kilowatt generators which are expected to produce an average of 636 million kilowatt-hours of electric energy yearly.

The estimated cost of the project is $94.6 million and completion is scheduled for 1968 although power production is expected two years earlier.

### Iron Furniture Plant — N. C.

Nearing completion is $500,000 wrought iron furniture plant being erected on a 12 acre tract in Salisbury, N. C. for the **Woodard Co.**

The 33,000 sq ft plant will manufacture a new line of furniture which will be sold under the corporate name of "Carolina Forge."

Larry Shaw will be manager of the plant.

### Generating Plant Underway for CP&L

Trial operations of the first unit (185,000 kw) of **Carolina Power & Light Co.'s** Darlington County steam electric generating plant are scheduled for mid-1960. Ultimate capacity of the plant will be 1,000,000 kw.

Water has begun rising in the 2,500 acre lake behind the 5,000 ft long and 65 ft high dam. The lake will supply 150,000,000 gallons of water daily for cooling purposes at the plant. Also underway are five coal silos, the unit's stack, the boiler framework, and the substation.

### $450,000 Soybean Plant for Arkansas

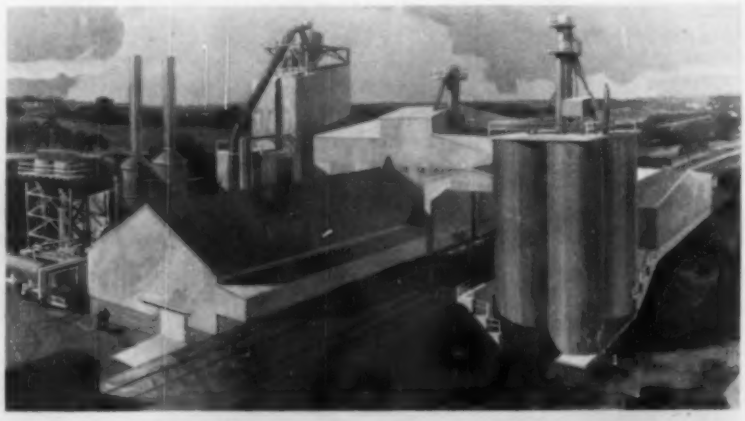
Construction is underway on $450,000 soybean solvent extraction plant for the **Farmers Co-op** of Van Buren, Arkansas. The facility will have a capacity of 200 tons per day and will process 6,666 bushels of soybeans daily, operating on a 24 hour basis.

French Oil Mill Machinery Co. of Piqua, Ohio will furnish equipment for the plant which will be ready for operation in time for the 1959 soybean harvest.

### Devoe & Raynolds Opens in Houston

Opening of the new million-dollar Houston, Texas paint manufacturing plant of **Devoe & Raynolds Co., Inc.** at 6767 Kirbyville Rd. marks the company's tenth production facility.

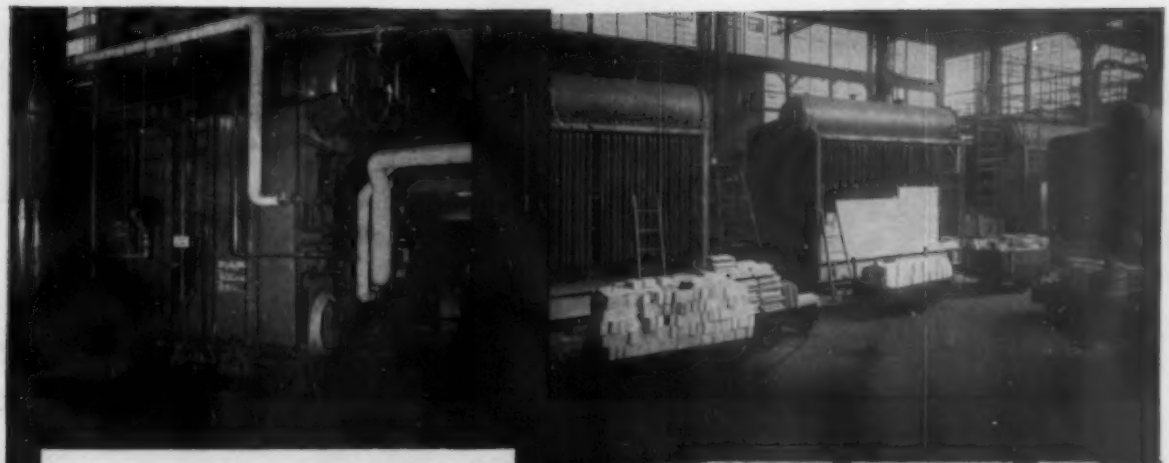
The plant will supply the Southwest market and will also manufacture the Pee Gee line of paints, according to Doran S. Weinstein, President.



### Clay Activation Unit — Louisiana

The Milwhite Co. has contracted for **Morton Chemical Co.** to manufacture acid activated clay absorbents for petroleum, edible oil refiners and other process industries at a clay activation unit being erected adjacent to Morton's acid plant at Weeks Island, La.

Kidde Processing Co. engineered the unit and M. W. Kellogg Co. is general contractor. Production is anticipated soon.

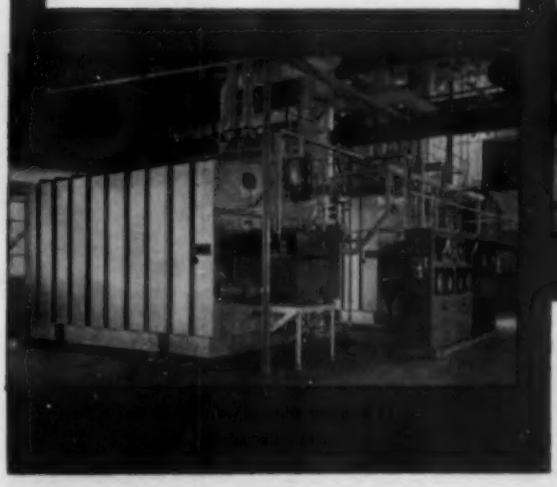


# More Steam per dollar of investment with Vogt

## PACKAGE WATER TUBE BOILERS

Completely shop fabricated, with burners, controls and accessories installed before shipment.

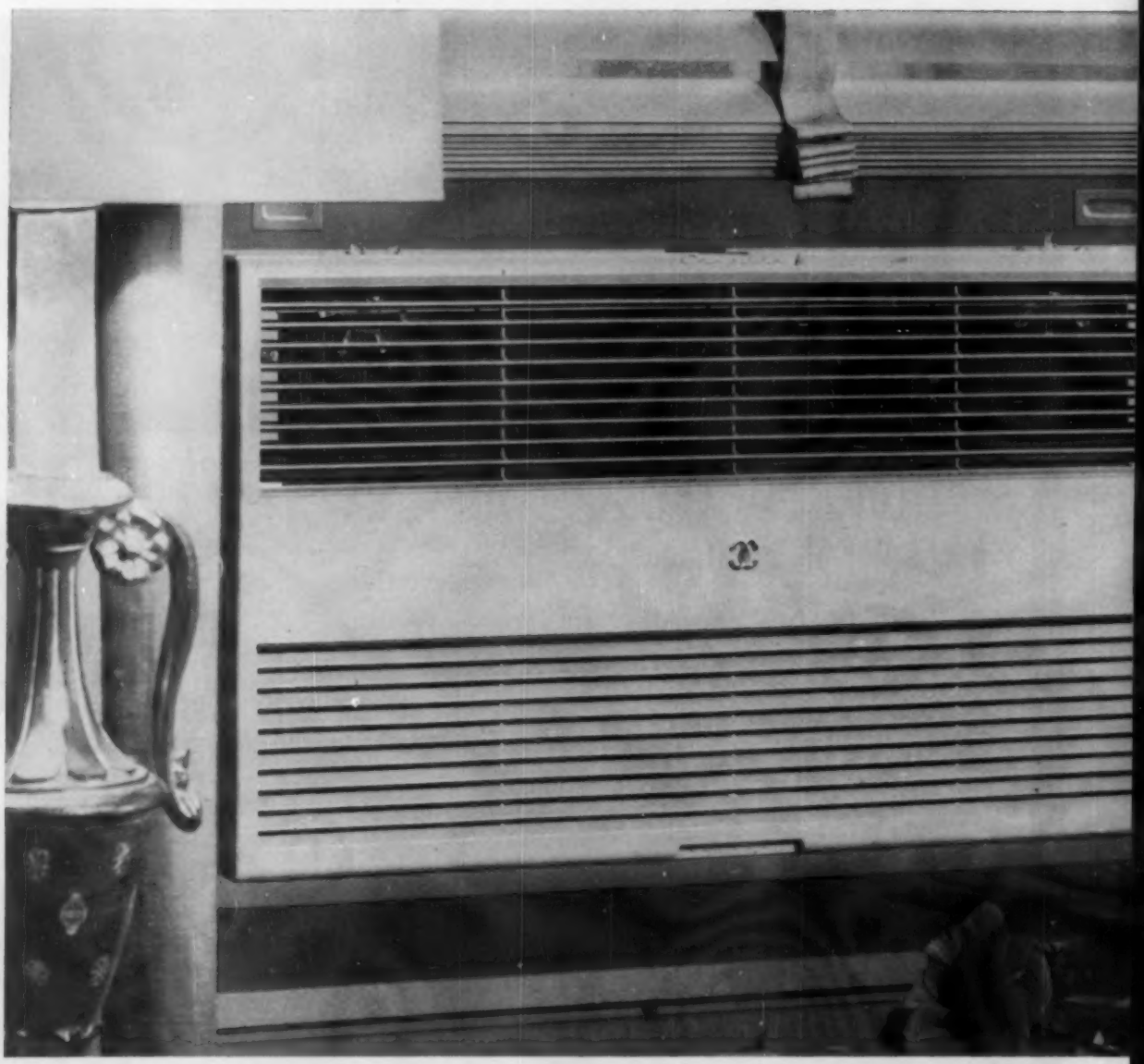
Placed on a suitable foundation, only fuel, water, breeching and steam connections need to be made to place unit in operation. Vogt Package boilers are available in oil and/or gas fired types in standard pressures of 175, 250 and 375 pounds per square inch gage.



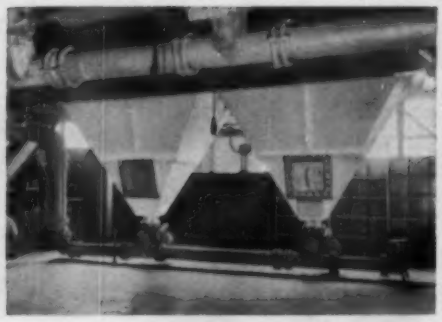
*Write for literature Address Dept. 24A-BS*

**HENRY VOGT MACHINE CO.**
**LOUISVILLE, KENTUCKY**

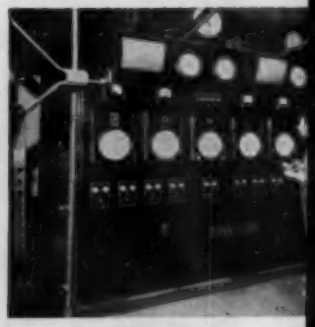
SALES OFFICES: New York, Chicago, Cleveland, Dallas, Camden, N. J., St. Louis, Charleston, W. Va., Cincinnati



General view of Carrier power plant. Boilers on right are bent tube, two-drum types, by Riley Stoker Corp. burning pulverized coal. Coal moves from bunkers to Riley Pulverizers (at left in photo) and then into furnace.



Mechanical dust collectors by Prat-Daniel Corp. help assure cleanliness of operation. These collectors tie in with United Conveyor ash handling system for movement to ash silo and final disposal.



Pneumatic automatic control panel by Bailey Meter Co. regulates combustion operation of all boilers and auxiliary equipment, maintains continuing steam generation efficiency!

# Carrier puts the chill on fuel costs...with coal

## Air conditioner manufacturer uses coal for low-cost steam

An unusual team—the heating ability of coal and the cooling facility of air conditioning equipment! Yet Carrier Corporation, Syracuse, N.Y., found this combination profitable when expansion plans required additional capacity in its steam plant. After engineering surveys, Carrier decided to continue burning coal for economy of operation. Today modern power equipment supplies steam *economically* for heating, air conditioning and processing. Original fuel costs plus automatic operation within the power plant hold overall steam costs to a minimum.

### Coal is lowest cost fuel

Today, *when the annual cost of fuel often equals the original cost of the boilers,* you should know that bituminous coal is the lowest cost fuel in most industrial areas. And modern coal-burning equipment gives you 15% to 50% *more* steam per dollar, while automatic operation trims labor costs and eliminates smoke problems. What's more, tremendous coal reserves and mechanized mining procedures assure you a constantly plentiful supply of coal at stable prices.

### Technical advisory service

To help you with fuel problems, the Bituminous Coal Institute offers a free technical advisory service. We welcome the opportunity to work with you, your consulting engineers and architects. If you are concerned with steam costs, write to address below or send coupon. Ask also for our case history booklet, complete with data sheets. You'll find them informative.

### Consult an engineering firm

If you are remodeling or building new heating or power facilities, it will pay you to consult a qualified engineering firm. Such concerns—familiar with the latest in fuel costs and equipment—can effect great savings for you with the efficiency and economy of coal.

## BITUMINOUS COAL INSTITUTE

Dept. SP-04, Southern Building, Washington 5, D. C.

**See our listing in *SWEET'S***

Coal is loaded into silos before it moves to bunkers. At left is the ash silo which utilizes rotary dustless unloader in loading trucks for disposal. Silos and conveyors are by Fairfield Engineering Co.

SEND COUPON FOR NEW BCI PUBLICATIONS. Guide Specifications, with complete equipment criteria and boiler room plans:

**BITUMINOUS COAL INSTITUTE,**
**Southern Building, Washington 5, D. C.**

Gentlemen: Please send me: SP-04

☐ GS-1 (low-pressure heating plant, screw-type underfeed stoker); ☐ GS-2 (high-pressure heating and/or process plant, ram-type underfeed stoker); ☐ GS-3 (automatic package boiler for heating and process plants). ☐ Case histories on larger plants.

Name_____

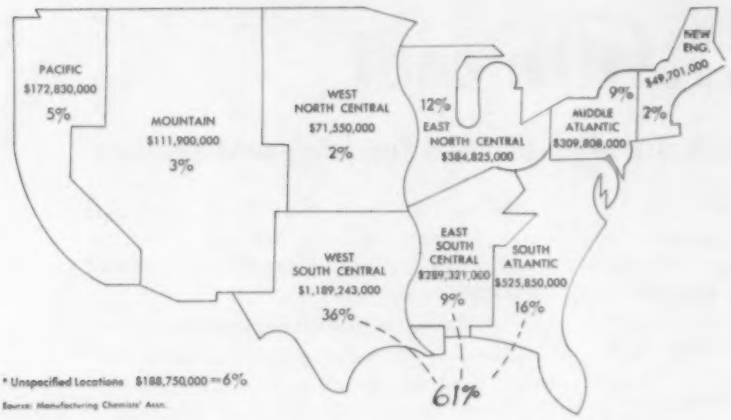
Title_____

Company_____

Address_____

City_____ Zone____ State_____

CHEMICAL PLANT CONSTRUCTION 1958-60 BY REGIONS
TOTAL FOR UNITED STATES: $3,293,778,000 = 100%




* Unspecified Locations $188,750,000 = 6%

Source: Manufacturing Chemists' Assn.

## South Leads in Chemical Expansion

Privately-financed chemical production facilities costing a record $1.775 billion were completed in the United States during 1958, the Manufacturing Chemists' Association announced recently.

The previous one-year high of $1.3 billion for completed construction was established in 1957.

The MCA, in releasing results of its annual construction survey, announced that an additional $1.054 billion will be spent for projects now underway and $464.090 million for projects scheduled for ground-breaking in the near future and completion before 1961. This brings total chemical plant construction to an estimated $3.293 billion for the three-year survey period, 1958-60. Of this total 61% is in the South-Southwest (see map).

Expenditure represents a total of 802 projects by 287 companies in 432 communities of 43 states.

The $1.518 billion total for the survey categories of Under Construction and Planned (1959-60) Construction is more than $1 billion under the $2.54 billion listed for the same categories in last year's survey results.

The MCA survey is based on activity within the chemical industry itself and on the chemical operations of firms, such as the oil and rubber companies, primarily associated and identified with other industries.

The costs of foreign construction, government-financed construction, office, warehouse and other separate service facilities are excluded from the survey, as are the installation or modification of equipment in existing facilities.

In addition to the cutbacks caused by the recession, the billion-dollar drop from the previous survey total for Planned Construction and Under Construction is said to reflect a general leveling off of the chemical industry's requirements for new facilities.

This "leveling off" is not considered alarming throughout the industry, however, because long-term goals — established after World War II to meet the demands of a projected population increase and a rising economy — are being realized to a large extent.

The chemical industry, for example, has invested more than $1 billion in new plants and equipment for eight consecutive years and the average annual investment for the past 13 years has been more than $1 billion.

Most industry leaders, according to the MCA, expect that new product demand resulting from recent technological and sociological trends will result in continued steady expansion of chemical-producing facilities.

Texas with $662.323 million again has the highest total figure for the three survey divisions of Planned Construction, Under Construction and Completed (1958) Construction.

Louisiana repeats in second place with $473.2 million, and in number three position is California with $144.710 million. Others in the top 10 are Tennessee, $142.576 million; West Virginia, $136.650 million; Ohio, $134.9 million; Pennsylvania, $127.190 million; New Jersey, $117.114; Illinois, $114.850 and Florida, $113.625 million.

Ranking 11 through 30 are Virginia, North Carolina, Kentucky, Michigan, New York, Indiana, Kansas, Oklahoma, Georgia, Maryland, New Mexico, Alabama, Mississippi, Massachusetts, Delaware, Washington, Connecticut, Missouri, Idaho and Wyoming.

The West South Central States — Arkansas, Louisiana, Oklahoma and Texas — again lead in total construction by region for the three-year survey period with a collective figure of $1.189 billion.

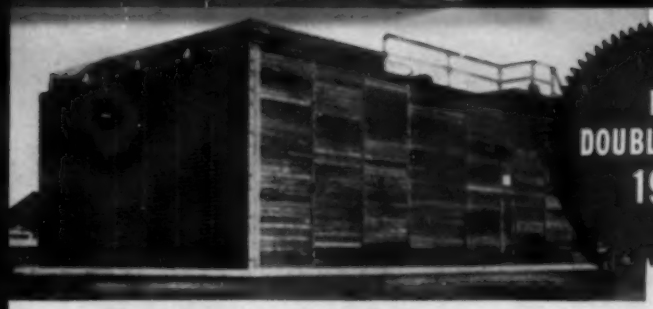
Other regions, too, duplicate their order of last year. Second are the South Atlantic States — Delaware, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia and West Virginia — with $526.350 million. The East North Central States — Illinois, Indiana, Michigan, Ohio and Wisconsin — are third with a total of $384.825 million.

Following these are, by rank, the Middle Atlantic, East South Central, Pacific, Mountain, West North Central and New England States.

## Steel Service Center — Memphis

**United States Steel Corporation's** U. S. Steel Supply Division will build a new steel service center at Memphis, Tenn. on a 6 acre tract on President's Island, Memphis, Tenn.

The Memphis warehouse, which will become one of twenty U. S. Steel Supply Division centers located throughout the United States, is scheduled for completion this year. The new facility, with about 40,000 square feet of floor area, will offer a complete line of steel and steel strapping materials and equipment to customers in central and southwestern Tennessee, Arkansas, Mississippi and northern Louisiana. It will be operated in conjunction with the supply division's district warehouse in Birmingham, Alabama, which was opened last May.



First DOUBLE-FLOW 1938

*20 Years and 2000 Double-Flows later*

# Marley Class 600 Double-Flows®

## again revolutionize water cooling!

Once again, Marley introduces a tower so new in design and unprecedented in performance that it signals another 7-league stride in industrial water cooling. It is the new Marley Class 600 Double-Flow, successor to the original Double-Flow that has been, by any standard of measurement, America's Number One Industrial Cooling Tower since its introduction in 1938.

Since that time, as evidenced by 2000 Double-Flows in service, Marley's leadership in industrial cooling tower design has never been challenged, for Marley has constantly improved every functional and structural element, all to further its goal of "moving more air to cool more water efficiently". Such improvement is everywhere apparent in the new Class 600 that offers new economies in basin cost and power usage . . . lower draft loss . . . more uninhibited air flow . . . longer service life . . . no splash-out or icing . . . increased cooling capacity in every frame size!

The Class 600 Double-Flow represents technological advances of major importance to everyone in industry concerned with water cooling and conservation. These advantages and complete data on design and components are detailed in a new 20-page booklet — Bulletin CF-59.

**Ask the Marley Engineer in your city for a copy of CF-59 — or write today.**

Marley equipment and components covered by U. S. and Foreign Patents and Patents Pending

First CLASS 600 DOUBLE-FLOW 1958

MARLEY

***The Marley Company***

Kansas City, Missouri

## Gas Processing — New Orleans

The Fluor Corporation, Ltd. has completed construction of a 150 million cubic-feet-per-day gas processing facility which is jointly owned by **Texas Natural Gasoline Corporation** and **Tennessee Gas Transmission Company.** The plant is located about 15 miles southeast of New Orleans, Louisiana, and is operated by Texas Natural Gasoline Corporation.

It will process natural gas from various fields in Southern Louisiana and the Mississippi River Delta area.

Initially, product fractionation facilities will handle approximately 380,000 gallons per day of liquid product. Included in the products are: propane, normal butane, isobutane, and natural gasoline. Additional products will be produced when more gas becomes available in the area.

## Plastic Film Cartersville, Ga.

July completion is anticipated for the polyethylene plastic film plant for **Visking Co.** which is underway on a 15 acre site in Cartersville, Ga.

Employing 100 people, the plant will manufacture the film for use as a packaging material, in construction as a vapor barrier, in agriculture in making silage, and for fabricating instrument balloons.

## Linde Company Oxygen Plant for Ala.

A large liquid oxygen and nitrogen producing plant will be built near Huntsville, Alabama, in the vicinity of the Redstone Arsenal, by **Linde Company,** Division of Union Carbide Corporation. The liquid oxygen and nitrogen will be used by southern aircraft and missile industries as well as the steel, chemical, petroleum and food industries of the South.

The plant, which will be capable of producing 100,000,000 cubic feet of oxygen and nitrogen per month, will be completed early in 1960.

## Chemical Plant Underway–Shelby, N. C.

**Fiber Industries, Inc.** has announced that Daniel Construction Co. of Greenville, S. C. has begun construction on a new forty-million-pound-a-year polyester fiber plant at Shelby, N. C. The plant is to be completed during the latter half of 1960.

Fiber Industries, Inc. was formed last year by Celanese Corporation of America and Imperial Chemical Industries of Great Britain to produce and market their product, Teron.

## $4.3 Million Plant — Am. Potash & Chem.

**American Potash & Chemical Corporation's** new $4,300,000 sodium chlorate plant at Aberdeen, Miss., has gone on stream and is in production.

The new plant, designed for an initial production of 15,000 tons of sodium chlorate per year, was constructed primarily to supply chemicals to the rapidly growing southern pulp and paper industry for bleaching pulp and paper. It also is used in weed killers and cotton defoliants.

Production at the Aberdeen plant, combined with sodium chlorate output at the Henderson, Nev., plant of American Potash & Chemical Corporation will total approximately 40,000 tons per year, about 45 per cent of current domestic consumption, and will make AP&CC the largest producer in the United States.

Aberdeen plans include provisions to expand sodium chlorate production facilities to meet future demand or to manufacture oxidizers.

## Conoco Expanding in Oklahoma

An expansion and modernization program at Continental Oil Company's oil products compounding and packaging plant in Ponca City, Okla. which will cost approximately three quarters of a million dollars, are underway with completion expected by fall, 1959.

The program includes construction of a modern warehouse adjacent to the compounding and packaging plant. Measuring some 310 feet in length and 110 feet in width, it will provide an additional 34,000 square feet of floor space. The present plant contains 56,000 square feet of floor space.

As part of the program, a new automatic blender and homogenizer will be installed at the plant, which will permit the automatic blending of the exact proportions of various ingredients in lubricating oils. Additional facilities will include mechanical empty can handling machines, automatic palletizing equipment for handling drums and containers, and other automatic equipment.

## Tabet Mfg. Expanding in Va.

**The Tabet Manufacturing Co.** has announced plans for the construction on a 13 acre site of a second plant in Norfolk, Va., doubling its operating and production facilities.

The new 50,000-square-foot plant, scheduled for completion in 1960, will be devoted largely to production of the Virginia firm's patented revolutionary rotary wafer switch.

Tabet manufactures a number of other products including photoelectric street lighting controls, television and radio aluminum towers, automatic quick oil changer for cars and aluminum ladders.

## Caprolactam Plant for Beaumont, Tex.

A new 50,000,000-pound-a-year plant to manufacture caprolactam, an intermediate chemical for nylon fiber and plastics, is underway for **Du Pont's Co.'s** Explosives Department on the company's present site near Beaumont, Texas.

The new plant will provide a co-product, cyclohexylamine, which has a number of uses including the production of rubber accelerators. Both caprolactam and the co-product will be produced primarily for sale outside the company. Operations are planned for the third quarter of 1960.

# *Specify* POWELL
# PRESSURE SEAL GATE VALVES

In all sizes—600, 900, 1500, 2500 Pounds and Higher. Globe, Angle and Check valves also available.

Pressure Seal Gate Valves, made the superior Powell way, offer many advantages—including:

* Streamline flow passage—making possible maximum flow with minimum turbulence.
* Outstanding simplicity of design, smooth body contour and weight reduction—assuring easier installation, greatly reduced insulating costs, and a marked saving in space.

For all your flow control requirements—water, oil, gas, air, steam, and corrosive fluids—Powell has the right valve in the right size and the right metal. Consult your local Powell distributor or write directly to us.

**THE WM. POWELL COMPANY**
*Dependable Valves since 1846*
**Cincinnati 22, Ohio**

**POWELL**...world's largest family of valves

## FUTURE EVENTS of Engineering Interest

**Apr. 2-3: Annual Conference on Electrical Application in the Textile Industry:** American Institute of Electrical Engineers; Heart of Atlanta Motel, Atlanta, Ga. J. W. Ward, EE, Avondale Mills, Sylacauga, Ala.

**Apr. 22-24: 38th Annual Convention.** Natural Gasoline Assoc. of America, Dallas, Tex. R. E. Cannon, Secy., NGAA, 421 Kennedy Bldg., Tulsa 3, Okla.

**Apr. 19-23: 31st Annual OGP Conference & Exhibit.** ASME, Shamrock-Hilton Hotel, Houston, Tex. T. M. Robie, Secy., ASME, OGP Div., 722 Harrison Ave., Beloit, Wis.

**May 4-6: Southern Metals Conference.** Bon Air Hotel, Augusta, Ga. SMC Committee, 567 Banks Mill Rd., S.E., Aiken, S. C.

**May 11-13: Joint Automation Conference:** ASME, AIEE, and Institute of Radio Engineers, sponsors; Pike Congress Hotel, Chicago, Ill. F. D. Synder, c/o Westinghouse Electric Corp., 40 Wall St., New York 5, N. Y.

**May 11-13: Second Annual Power Conference.** President Hotel, Kansas City, Mo. Charles K. Koegel, Pub. Chairman, Kansas City Section of the Instrument Society of America, 8900 Westbrook Dr., Overland Park, Kansas.

**May 14-23: 14th International Petroleum Exposition.** Tulsa, Okla.

**June 1-5: 5th World Petroleum Conference Exposition.** Coliseum, New York, N. Y. E. K. Stevens, Exposition Mgr., International Exposition Co., 480 Lexington Ave., New York 17, N. Y.

**June 9-12: Material Handling Institute's Exposition.** Public Auditorium, Cleveland, Ohio. W. L. Redding, Hanson & Shea, Inc., One Gateway Center, Pittsburgh 22, Pa.

**June 21-26: Annual Meeting. Air Pollution Control Association.** Statler Hotel, Los Angeles, Calif. Harry M. Pier, Exec. Secy., APCA, 4400 Fifth Ave., Pittsburgh 13, Pa.

**Sept. 17-19: 41st Annual Meeting.** Public Utilities Assoc. of the Virginias, The Greenbrier, White Sulphur Springs, W. Va. Robert W. McKinnon, Exec. Secy., PUAV, 602 First Federal Bldg., Roanoke, Va.

**Sept. 27-30: 3rd Annual National Power Conference:** ASME and AIEE, co-sponsors; Hotel Muehlebach, Kansas City, Mo. Fred P. Gilpin, Kansas City Power & Light Co., Box 679, Kansas City 41, Mo.

**Oct. 22-25: Annual Meeting.** American Society of Industrial Designers, Grove Park Inn, Asheville, N. C. ASID, 15 E. 48th St., New York 17, N. Y.

**Nov. 16-20: 5th International Automation Exposition & Congress.** New York Trade Show Bldg., 500 Eighth Ave., New York, N. Y. Richard Rimbach Assoc., Inc., 845 Ridge Ave., Pittsburgh 12, Pa.

## PLANT PERSONNEL

**Ernest H. Newman, Jr.** has been named manager of the Chattanooga, Tenn. Plant of W. S. Dickey Clay Mfg. Co., replacing **Arthur G. Brading,** who has retired after 53 years of service with the company.

Promoted to manager of the Buckeye Cellulose Corp. pulp plant at Memphis, Tenn. is **Charles A. Montague, Jr.**

Supervisory personnel named at the newly opened Houston, Tex. plant of Devoe & Raynolds Co., Inc. include: **Roy H. Gunter,** Plant Manager; **Ervin L. William,** Asst. Plant Manager; **Tommy Clayton Williams,** Production Foreman; and **Kenneth L. Fehlis,** Warehouse & Traffic Superintendent.

**Jack Evans** has been named manager of the Cookeville Shirt Co., succeeding **W. R. Mayes,** who has become assistant general manager of the shirt division of Washington Mfg. Co. in Nashville, Tenn.

Plant manager of Trane Co.'s new $1,500,000 heating and air conditioning products plant in Clarksville, Tenn. is **Robert L. Galloway.**

Advanced from manager of production to vice president of manufacturing for the J. B. Beaird Co., Inc., Shreveport, La. is **Joseph LaBarbera.**

**Joseph S. Miller** has been appointed Vice President & General Manager of Atlanta Wire Works Inc. in Atlanta, Ga. while **John B. Hodgson** has been named Plant Manager.

Changes in personnel at the Carolina Division of Riegel Paper Corp. in Acme, N. C. include: **A. L. M. Bixler,** Manager of Manufacturing Services; **J. D. Dailey,** Manager of Pulp & Paper Production; **T. J. Kayhart,** Chief Engineer; and **R. O. Brandt,** Power Plant Superintendent.

New appointments at the Reed Roller Bit Co. in Houston, Tex. are: **J. A. Grundy,** operating vice president; **Wiley B. Noble,** vice president; **G. J. Gilbert,** chief engineer; **R. G. Stockton,** materials manager; and **T. B. Ellis,** factory manager.

**H. S. Farmer** is the new manager of Ralston-Purina Co.'s feed mill in Louisville, Ky., succeeding **Fred W. Kessler, Jr.,** who has been transferred to Wilson, N. C. as mill manager.

## $1,000,000 Feed Plant for Alabama

The Feed Division of **The Pillsbury Company** will build a $1,000,000 push-button feed plant in Jasper, Alabama, 40 miles northwest of Birmingham, to service the area's rapidly growing broiler-raising industry.

The new plant will be located 40 miles northwest of Birmingham. Expected to be in operation by the spring of 1960, the plant will have a capacity of 250 tons per eight-hour shift.

# Why Every Steam Heated Unit Needs its Own Steam Trap

## . . . the theory, practice and proof of "unit trapping" for top temperatures

Using an individual trap for each steam heated unit, including each separate coil, chest or chamber of a machine—pays off for the user. Here are just two examples:

1. On a creamery dryer

| *Drainage Method* | *Air Temperature* |
|---|---|
| Restricted Blow-thru | 250° |
| Group trapping (1 trap for 8 coils) | 225° |
| **Armstrong Unit Trapping (8 traps—1 for each coil)** | **309°** |

2. On a platen press

| *Drainage Method* | *Processing Time* |
|---|---|
| Restricted Blow-thru | 50 minutes |
| Group Trapping | 35 minutes |
| **Armstrong Unit Trapping** | **25 minutes** |

### Why Unit Trapping Works Best

It is reasonable to assume that no two steam heated units will have *identical* condensing rates. Even the slightest difference in rate will cause a difference in steam pressure drops through the units. Here's where the trouble starts. Condensate from each unit may flow to the trap. But, what about air and other non-condensibles in the system? A difference in pressure drops too small to be indicated by an ordinary pressure gauge will permit backflow of steam from the higher pressure units to the lower pressure units. This backflow of steam may even impede flow of condensate from the lower pressure unit to the trap . . . and it will definitely impede or block off flow of air to the trap. The result is sluggish heating, reduced temperatures, reduced output, fuel waste and increased possibility of corrosion. Figures 1, 2 and 3 diagram the action.

### Unit Trapping Not Costly

No engineer wants any more mechanical devices in his plant than are absolutely necessary. But, the moderate additional cost of using two or more small traps, instead of one big one, is saved over and over again in improved efficiency.

If the traps are Armstrong, maintenance is no problem. And users frequently tell us that Armstrong traps outlast others two and three to one.

Steam traps usually represent a fraction of 1% of the cost of the equipment they drain. Does it make good sense to lose 10% or more of equipment capacity to save a few dollars on traps?

Why not test Armstrong unit trapping in your plant. If you are not completely satisfied with the results you can return the traps for a full refund of the purchase price. There is little to lose—lots to gain. Call your local Armstrong Factory Representative or Distributor, or write **Armstrong Machine Works, 8062 Maple St., Three Rivers, Mich.**

ASK FOR the 44-page Steam Trap Book and reprint of article on Unit Trapping.

80157

**ARMSTRONG STEAM TRAPS**

**How Different Condensing Rates Can Slow Production**

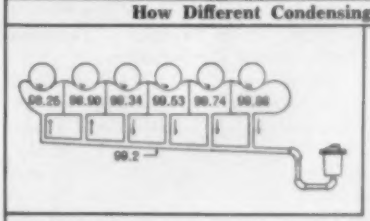



*Fig. 1 This is a 6-roll ironer shortly after it has begun operating on 100 psi steam. When cold, wet material passes over chest 1, steam condensing rate is high and pressure drops accordingly. The pressure drop in chest 2 will not be as great, and so on down the machine as the material becomes progressively hotter and drier. Average pressure in the chests then is 99.27 lbs., and drain header pressure is slightly less, about 99.2 lbs. Under these conditions, steam from drain header enters chests 1 and 2 (as indicated by arrows at side of drain lines) because of pressure difference. Though condensate from chests drains by gravity, air can't leave chests countercurrent to incoming steam. Fig. 2 shows what happens next.*

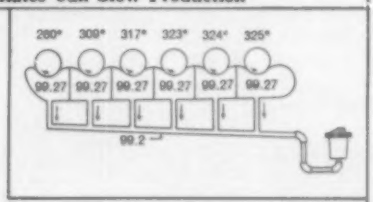



*Fig. 2 This is the same 6-roll ironer after it has been operating a while. Air has accumulated in chests 1 and 2, reducing condensing rate and decreasing pressure drop. This process repeats itself down the line until pressures are as shown—that is, enough air will accumulate in each chest so that condensing rates and pressure drops of all chests will be about equal. The net result is shown in chest temperatures which are actual pyrometer readings taken on a 6-roll ironer, drained by a master trap, in a Chicago laundry. The laundry was making 337.9°F steam, but getting an average of only 309.6°F from the ironing surfaces, necessitating slow operation and frequent reruns. Then they tried Armstrong unit trapping—see Fig 3.*

**How Unit Trapping Prevents Trouble**

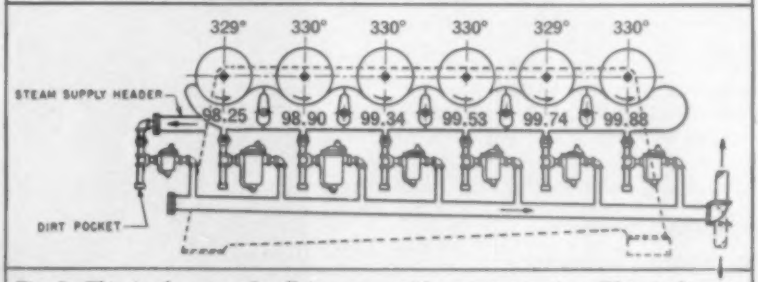



*Fig. 3 This is the same 6-roll ironer, now unit trapped. Temperatures shown are also actual pyrometer readings—the average of 329.6°F is 20° higher than with group trapping. This is because air is continually removed from each chest into the drain header, and cannot get back into any chest.*

# *Southern News Briefs (Continued)*

## H. K. Ferguson

Appointment of **Raymond B. Aufmuth,** 41, as chief engineer of **The H. K. Ferguson Company,** has been announced by Ralph W. Olmstead, president of the internationally-known Cleveland firm of industrial engineers and builders. In his new position, Aufmuth will direct and coordinate all engineering activities of Ferguson's world-wide operations.

## Vulcan-Gary Merger

**Vulcan Materials Company,** Birmingham, Alabama, has acquired **Gary Slag Corporation,** Gary, Indiana. Vulcan is one of the nation's largest producers of building and construction materials.

At a meeting held in Chicago, representatives of both firms finalized the purchase of Gary Slag's capital stock by Vulcan.

Vulcan's principal products include aggregates, concrete, concrete pipe, ready-mixed concrete, metallics, chemicals, and other construction materials. Gary Slag is engaged in the production of several types of blast furnace slag, and plans are underway for the expansion and modernization of its plant and production facilities.

## Atlanta Office for Boothe Leasing

**Harold R. Bish,** widely known Atlanta sales consultant and business advisor, has been named southeastern representative for **Boothe Leasing Corporation** of San Francisco, national lessor of industrial equipment and machinery.

In his new post, Mr. Bish will represent the Boothe firm in leasing machinery and equipment to credit-worthy industrial companies throughout the Southeast. More than 450 such companies in all sections of the nation are among present Boothe clients.

A native of Webster City, Ia., Mr. Bish established his present company in Atlanta in 1950 after four years' service as vice president and general manager of a large Chrysler Motors dealer in New York City.

## Fansteel — South

**J. M. Tull Metal & Supply Co., Inc.,** 285 Marietta St., N. W., Atlanta, Georgia, has been appointed sales agent for all products of the Metals and Fabrication Division of **Fansteel Metallurgical Corporation.**

Established in 1914, the J. M. Tull Metal & Supply Co. is well known throughout the southeastern states and has branches at Birmingham, Jacksonville, Miami, Greenville and Tampa.

The territory for metals, fabrications and alloys includes the states of Georgia, Alabama, North Carolina and South Carolina; for chemical equipment North Carolina, South Carolina, Georgia and Florida.

The Tull Company has appointed **James L. Henderson** as specialist for the Fansteel line. Since his graduation from Georgia Tech in 1948, he has been a sales engineer for the Tull Company in the chemical and marine field, specializing in nickel and special alloys.

## Armco D & M — Dixie Division

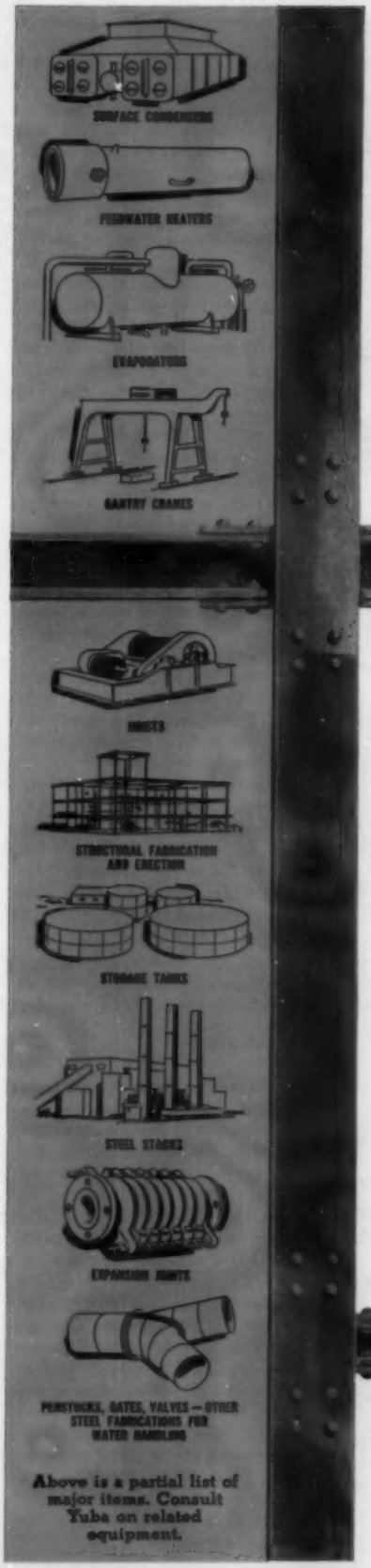
Several executive changes in the Dixie Division of **Armco Drainage & Metal Products, Inc.,** have been announced by S. R. Ives, president.

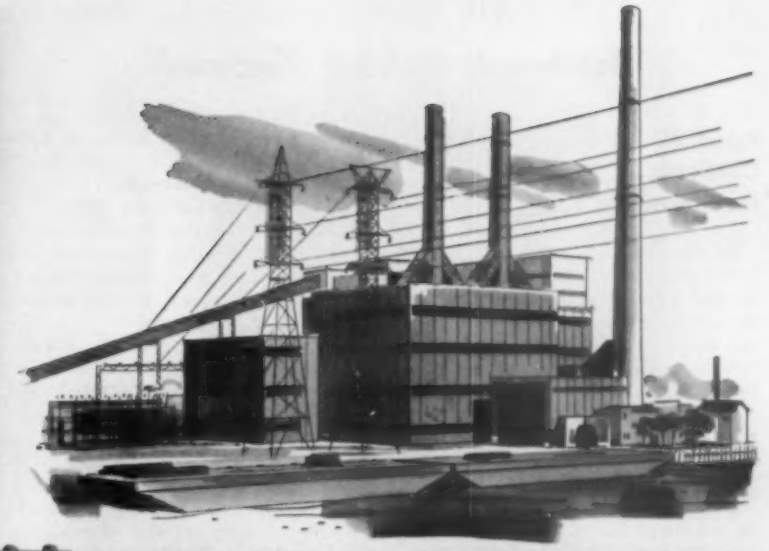
**L. L. Williams** has been appointed assistant division manager, a newly created position. Williams joined the Dixie Culvert & Metal Company, the forerunner of Armco Drainage's Dixie Division, in 1936. In 1945 he became special assistant to the division manager and state sales manager of Florida in 1953. He had been division sales manager since 1955.

**I. G. Tuttle** succeeds Williams as division sales manager. Tuttle became a salesman for Dixie Culvert & Metal Company in 1929 and was made state sales manager for North Carolina in 1932.

**W. M. Black** has been promoted to state sales manager for North Carolina. He joined Armco Drainage in 1951, and in 1953 became division sales engineer. Black was placed in charge of state highway department promotion in 1956 and in 1957 was advanced to manager of drainage and allied products sales.

**ATLANTA, GEORGIA** — At a recent Atlanta technical sales meeting **Howard W. "Bus" Stentz,** executive field engineer of Houston's **Wide-Lite Corporation** discussed industrial and commercial lighting equipment and trends. **The L. Morris Landers Co.,** representatives, and Atlanta distributors **Graybar Electric** and **Thompson-Wilson** sponsored the meeting. In the lower photo, **M. Clyde Haney** of L. Morris Landers Co. highlights design and operating features of the mercury-vapor fixtures to W. E. Davey and Joe Kahler of the Gulf Oil Corporation.



# LOOK WHAT YUBA MAKES FOR STEAM POWER PLANTS

Electric utilities planning construction of a new steam plant or expansion of present facilities, look to Yuba as a dependable, fully integrated source for all the varied equipment shown here. And for all the skilled services related to its design, engineering, installation or field erection.

Operating nationwide, the divisions and manufacturing plants of Yuba serving the power industry are ideally located to serve you better, providing a single-company responsibility so important in meeting highest product quality standards and delivery requirements — economically.

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YUBA

**YUBA CONSOLIDATED INDUSTRIES, INC.**

351 California St., San Francisco, Calif.

Plants and Sales Offices NATIONWIDE

# *Southern News Briefs (Continued)*

## April 20-23 OGP Conference Slated for Houston, Tex.

In cooperation with the South Texas Section of the ASME the 31st Annual Conference & Exhibit of the Oil & Gas Power Div. of the American Society of Mechanical Engineers will be held April 20-23 at the Shamrock-Hilton Hotel in Houston, Texas. A "get acquainted" reception is scheduled for 4:30 p.m. April 19 for early arrivals at which time a film "Texas Giant" will be shown.

The April 20 technical sessions beginning at 9:30 a.m., will include: Development of a High Compression Ratio Gas Engine; Development & Application of a Small 4-Cycle Turbocharged Gas Engine; AIEE-ASME Recommended Specifications for the Speed-Covering of Internal Combustion Engine-Generator Units; The Fifth Edition DEMA Standard Practices for Low & Medium Speed Stationary Diesel & Gas Engines; and Development of ASME-OGP Division Power Cost Reports. Also, representatives of the exhibiting manufacturers will give 3-minute briefs on new developments. The evening session will be a special lecture on Automation in the Oil & Gas Industry.

Tuesday's session will include papers on Turbocharging Development, 2-Cycle Radial Engines for Point Comfort; Installation, Operation & Maintenance of Turbocharged, 2-Cycle, Gas Engine Compressors; and Nondestructive Inspection Procedures for Pipeline Equipment. Inspection trips will begin at 1:00 p.m.

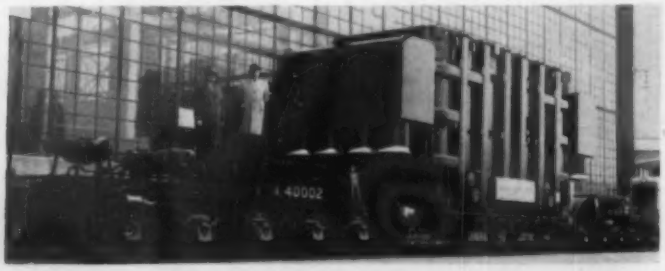
Sessions for Wednesday will include: Lubrication! Sez Who?; A Field Study of Gas Engine Lubricants; and 2 panel discussions on Engine Foundations, Design Theory & Construction and Engine Lubrication & Oil Filtering.

The annual banquet will be held Wednesday evening at which time awards will be presented for outstanding service to the internal combustion engine industry and for the best papers during 1958 at OGP meetings. Dr. Harold Vagtborg, President of Southwest Research, will be speaker of the evening on the subject of More and More from Less and Less.

The final day of the Conference (Thursday) will include Evaluation of Corrosion in Diesel Cylinders; Engine Waste Heat Utilization in a High Speed Geared Steam Turbine; Production Design of a Modern Axial Flow, Positive Displacement, Rotary Compressor; Mechanical Isolation of Torsional Vibrations in Geared Engine Drives; and Advantages of a Taylor-Made Construction Contract.

Chairmen and Vice Chairmen of the various technical sessions and panel discussions will be engineers of wide experience. Both written and oral discussion of the papers will be welcomed.

Greatly augmenting the value of the Conference is the Annual Exhibit where manufacturers show their products and have representatives available for discussion of their latest developments and applications.



## G-E Power Transformer for A P & L — Helena

A 325-ton power transformer for the **Arkansas Power and Light Company** has been shipped from **General Electric's** plant in Pittsfield, Mass. Rated 375,000 kilovolt-amperes, it is one of the two largest-capacity units ever built by G-E's Power Transformer Department, able to handle enough electric power to serve the homes of 600,000 persons. It will "step up" 22,800-volt power at the Helena, Ark., generating station to 230,000 volts for A. P. & L.'s transmission lines.

With bushings removed and oil drained for shipping, the big unit weighs over 450,000 pounds. Installed and operating it will weigh about 650,000 pounds. Its dimensions fully assembled, are 35 feet in length, over 20 feet in width, and about 24 feet in height.

To ship the giant unit, the heaviest rail freight load ever shipped, General Electric purchased a new specially-built depressed-center railroad car with a capacity of 250 tons. The car, designed to G-E specifications, permits even larger power transformers to be shipped upright in a one-piece tank for easy installation.

The special car is 88 feet long and rolls on 20 wheels. A six-wheel truck and a four-wheel truck at each end are joined by a span bolster. A trunion near the center of the span bolster supports each end of the drop frame. Triple articulation at each end permits the car to round curves easily.

The frame is a single steel casting weighing 60 tons. Its center platform is 30 feet long. The frame has a raised camber so that it becomes straight when loaded.

The car was built by the Thrall Car Manufacturing Company, Chicago Heights, Ill., and the drop frame, trucks and special span bolsters were built by General Steel Castings Corporation, Granite City, Ill.

## Worthington

**I. J. Karassik** has been appointed Consulting Engineer and Manager of Planning for the **Worthington Corporation,** Harrison Division. Formerly Consulting Engineer and Assistant to Vice President, Mr. Karassik will act as Consulting Engineer to all departments in the Harrison Division in his new assignment.

Mr. Karassik joined Worthington in 1934 as Assistant to the Consulting Engineer on centrifugal pumps and was assigned to design and research work. He later was named Manager of the Multi-stage Pump Section in the Centrifugal Pump Department and in 1956 was appointed Consulting Engineer and Assistant to Vice President.

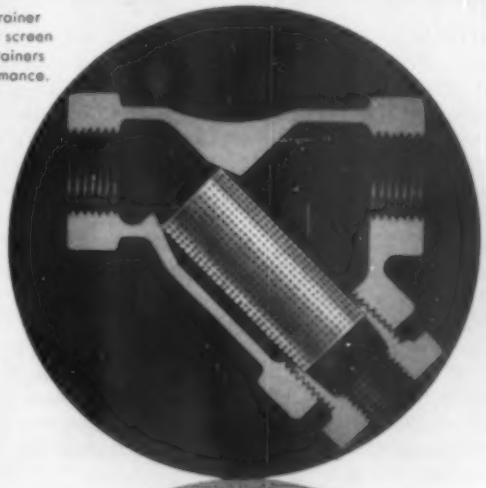
Mr. Karassik resides at 476 Walton Road, Maplewood, N. J.

*protect your equipment against scale and dirt*

Exterior view of NEW Sarco Type "AT" Pipe Line Strainer. Note 45° blow-down angle to facilitate piping away from strainer.

*with this*

# NEW SARCO TYPE "AT" PIPE LINE STRAINER



Cutaway of NEW Sarco Type "AT" Strainer shows sediment collection chamber below screen. Standard screen used in Sarco "AT" Strainers is key to their uniformly successful performance.

Examine one of the new Sarco Type "AT" Strainers and you'll notice at once that its design is a marked improvement over that of contemporary strainers . . . in three important ways:

The Sarco screen, key element of the unit, fits tightly into a long, tapered screen seat. This feature absolutely stops the by-passing of particles around the screen. Secondly, the rigid, welded construction of heavy-gauge brass makes sure the fit will remain tight, even when trapped sediment builds up pressure.

Third, you'll see that the new AT is easy to clean. No sharp edges or weave crevices in the screen for particles to cling to. Blow-down cleaning is simplified by the 45° angle construction.

Write for Sarco Bulletin No. 1210B which gives dimensions, capacities, and technical data. 7317-B

**NOTE THIS ADDED PROTECTION AND CONVENIENCE**

1. Bodies of heavy-duty 250 psi semi-steel. Tensile strength to 30,000 # per square inch minimum.
2. For maximum strength, bodies are reinforced with external rib.
3. Long, tapered screen seat assures correct screen position and tight fit without buckling.
4. Cap design provides a sediment collection chamber below screen.
5. Generous proportion of open screen area in relation to pipe size minimizes pressure drop.

**SARCO**
**COMPANY, INC.**
635 Madison Avenue, New York 22, N. Y.

STRAINERS • STEAM TRAPS • TEMPERATURE CONTROLLERS • HEATING SPECIALTIES

# INDUSTRY SPEAKS

## Revolution in the South

**By Arthur V. Wiebel, President**
Tennessee Coal & Iron Division
U. S. Steel Corp.
Fairfield, Alabama

Extracted from a talk to the national directors of the National Society of Professional Engineers at a meeting in Birmingham, Alabama.

**REVOLUTION** is going on in the South, but it has nothing to do with courts or Congress, laws or legislatures. The revolution of which I speak is economic in nature, but its sociological implications far outweigh anything you have been reading about us recently.

In land area, the South comprises about one-quarter of the United States, not counting Alaska. Population-wise, it has about one-quarter of the nation's people. Climatically, it is probably the best part of the U. S., insofar as business is concerned. We produce approximately one-half of America's minerals. The South has 48% of the nation's clay, 53% of the coal, 65% of petroleum, 76% of the natural gas and 100% of the bauxite and naturally occurring sulfur.

With the greatest average rainfall, we are better fixed for water than any other region — for industrial usage, electric power plants, transportation. The South has 40% of the nation's forest area. Trees are grown as crops in the South today.

Probably the greatest drawback to Southern progress has been its people's lack of awareness and belief in their own inherent capabilities. There has been a grand awakening to the potential of the South, and a new aggressive attitude is fast supplanting the apathy that was for so long the hallmark of this region.

Pick up any business or trade periodical, and within its covers you will find one to a half-dozen advertisements designed to sell the South as an ideal place to establish plants and offices. Cities, states and businessmen are working hard to bring new industries to the area. Less noticeable but more significant is the fact that a tremendous proportion of the new business concerns of Dixie are completely Southern concerns — conceived and established by Southerners and largely financed by Southern capital.

At the turn of the century, the South had 9% of the nation's manufacturing facilities; today it has 22%. Thirty-nine per cent of American chemical manufacturing is now in the South, and the per cent is still rising. The bulk of production of man-made fibers is in the South. Synthetic rubber and plastics of every description are turned out here in great volume.

If fencing worked a great transformation on the West, its effect upon the South has been even more drastic. The enclosure of fields and grazing lands has gone hand-in-hand with the application of scientific methods and efficient business procedure to reshape entirely the agricultural situation of Dixie. Now, as much intelligence and effort are being devoted to the maintenance of grazing lands as to improvement of the bloodlines of the cattle.

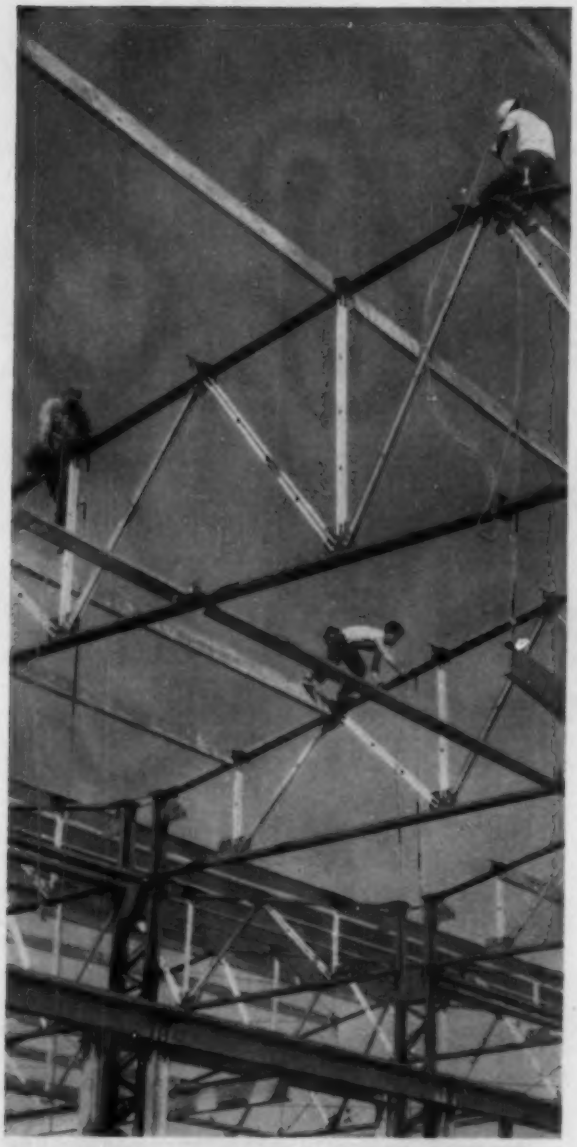
With the decline of cotton, and with the advent of diversified farming, the production of fruits and vegetables is gaining ever-greater dimension in the South. Food processing is an 11 billion dollar industry and the prospects for future growth are excellent.

Today the South leads the field in American ship construction. From Maryland around the Atlantic and Gulf Coasts to Texas, and at various inland ports, plants are building vessels of every size and description: shrimpboats and tugs, tankers and barges, luxury liners and atomic submarines.

From 1946 to 1956 factory employment in the Southeast rose 22%, as compared with 9% for the nation as a whole.

Whatever dissensions and disharmonies may beset us from time to time, the course toward the future is set; and nothing can check our progress toward a better day. Under all the mountains of bombast and oratory there are cold, hard facts and figures that reveal a South with which the world has not yet become familiar. The conscientious, level-headed citizens of the South may one day hold the destiny of America in their hands. — Coming South you come face-to-face with tomorrow.

# Here's The Way To Save
# BUILDING DOLLARS



Workmen assemble strong, lightweight roof structure of a big Truss-Type Armco Steel Building. Their work demonstrates three prime advantages of building the Armco Way.

FIRST, in the design stage, you gain the economies and convenience of pre-engineered, tested structurals as well as covering materials. Clear spans range to 100 feet, with wall and roof load designs specifically tailored for your area.

SECOND, in the construction stage, you'll find that precision-made parts go together quickly and correctly. Efficient Armco crews are equipped to do the erection job for you and your contractor.

THIRD, through long service, you gain low annual cost. In addition, Armco Buildings earn dividends with their limited maintenance requirements. Special Armco Steels like ZINCGRIP® and ALUMINIZED STEEL are well known for their durability. And special design features like the sloping, self-cleaning surfaces of the truss components add extra value.

**Get complete data about the Armco Steel Building that meets your building needs. Send the coupon to Armco Drainage & Metal Products, Inc., P. O. Box 1343, Atlanta, Georgia or C & I Life Bldg., Houston, Texas. Other offices in principal cities.**

---

Send details about Armco Buildings for the following use:

_____ Approximate size _____

NAME _____

TITLE _____

FIRM _____

STREET _____

CITY _____ ZONE _____

STATE _____

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*Subsidiary of* ARMCO STEEL CORPORATION

OTHER SUBSIDIARIES AND DIVISIONS: Armco Division • Sheffield Division • The National Supply Company
The Armco International Corporation • Union Wire Rope Corporation • Southwest Steel Products

# B&W Pulverizer Design Simplicity Cuts Maintenance

## A Compact, Space-Saving Package of Efficient Grinding Power

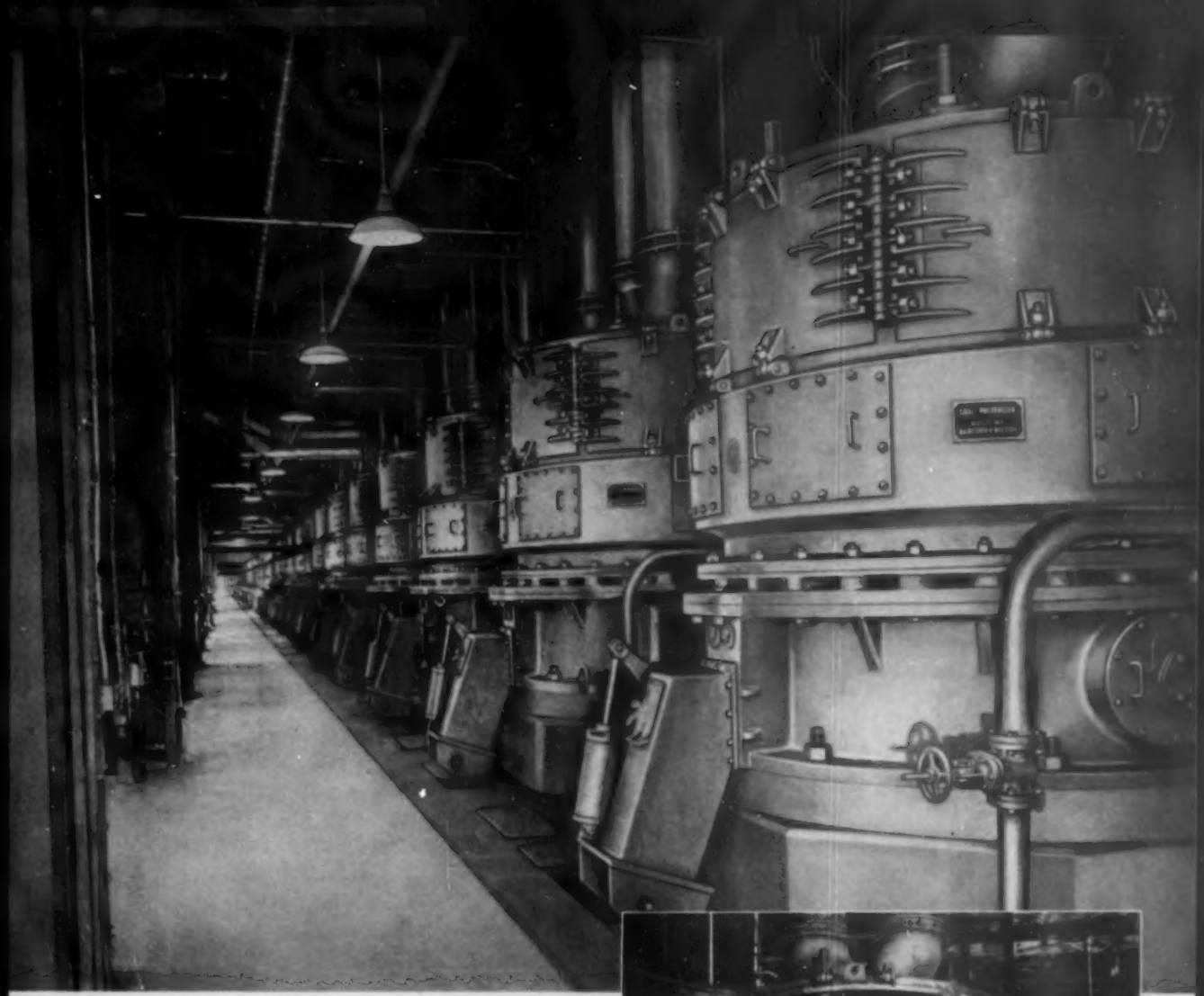
Exceptional output and efficiency records . . . highlighted by low maintenance . . . have been established in hundreds of installations by B&W Pulverizers. Their long-range dependability has been accompanied by reduced operating costs.

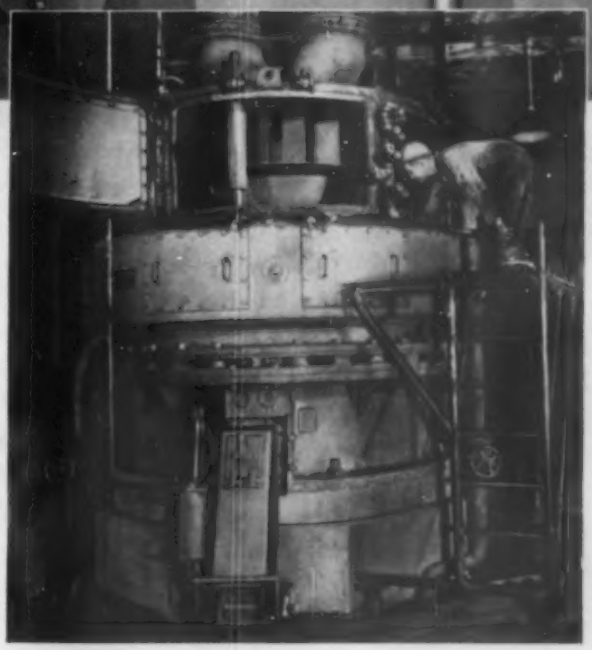
**Simplicity of Arrangement and Reduced Maintenance:** Accessibility for all normal maintenance makes it simple, quick, safe, and low-cost. Adjustments are easily made while the unit is in operation. Using only clean primary air supplied under pressure, fan maintenance is substantially reduced and fuel piping is greatly simplified. Also, with the pulverizer acting as its own distributor, no special distributing devices are needed. Grinding elements are of special alloy material. They last two years or more on eastern coals and at least a year on midwestern coals.

**Continuous High Fineness Over Entire Service Life:** Efficient combustion requires high fineness at all times. The high circulating load of the B&W Pulverizer permits efficient and dependable classification of product, so that only material of proper fineness leaves the unit. In addition, its slow-speed, spring-loaded ball bearing grinding elements maintain proper grinding contact throughout their service life.

**Handles Wide Variety of Low Grade and Wet Coal:** Regardless of the coal's grade or whether it's dry or soaking wet, the B&W Pulverizer's unique and exclusive recirculation of fuel through heated air assures efficient grinding . . . eliminates shutdown, capacity loss, or special attention from operators.

**Adaptable to All Types of Automatic Controls:** Because it features "one point contact with the





(Above) Part of the 42 B&W Pulverizers serving six B&W Open-Pass Boilers. (Right) Maintenance is simple: doors open wide, classifier and spring assemblies are readily accessible for removal. Grinding components are lifted without special rigging.

boiler," operation of the B&W Pulverizer is simple. The boiler's automatic combustion control is connected to the pulverizer at only one point—the damper in the primary-air duct. The pulverizer's own control system regulates all other functions, such as maintenance of proper fuel-air ratio and operating temperature.

**SEND FOR DATA.** For full information about the B&W Pulverizer and Pulverized-Fuel Firing Systems, write: The Babcock & Wilcox Company, Boiler Division, Barberton, Ohio.

B&W

THE BABCOCK & WILCOX COMPANY

*BOILER DIVISION*

G-924

# "Here at HONEYWELL we're control men

**Honeywell**
H First in Control

"We have a basic philosophy here at MINNEAPOLIS-HONEYWELL. As control specialists, we've learned that it is our *specialist's approach* to design, installation and service that enables our controls and instruments to do their best in operation.

"We feel the same way about elevators. We have 4 OTIS Passenger Elevators and 6 OTIS Freight Elevators in our Minneapolis plants. We know that they'd end up as strangely *mixed breeds* if we attempted their maintenance—because a careful study of the OTIS *specialist's approach* to maintenance has convinced us that only OTIS can keep our elevators running like new."

What is the OTIS *specialist's approach* to elevator maintenance?
It is MEN . . . MATERIALS . . . METHODS.

**MEN:** Elevator maintenance is no one-man job. It is an organization task requiring experts in many lines. No individual, even if he devoted his entire time to the job, could do it properly. It calls for men with an unusual combination of skills plus long OTIS training in studying parts, assemblies, functions, replacement procedures, testing and adjusting. Some degree of elevator complexity can be gleaned from the illustration at the right.

**MATERIALS:** Original OTIS parts and specially designed OTIS maintenance equipment are within one hour of 90% of all OTIS elevators in the U. S. for use in scheduled replacements—and to hold emergency shutdowns to a minimum.

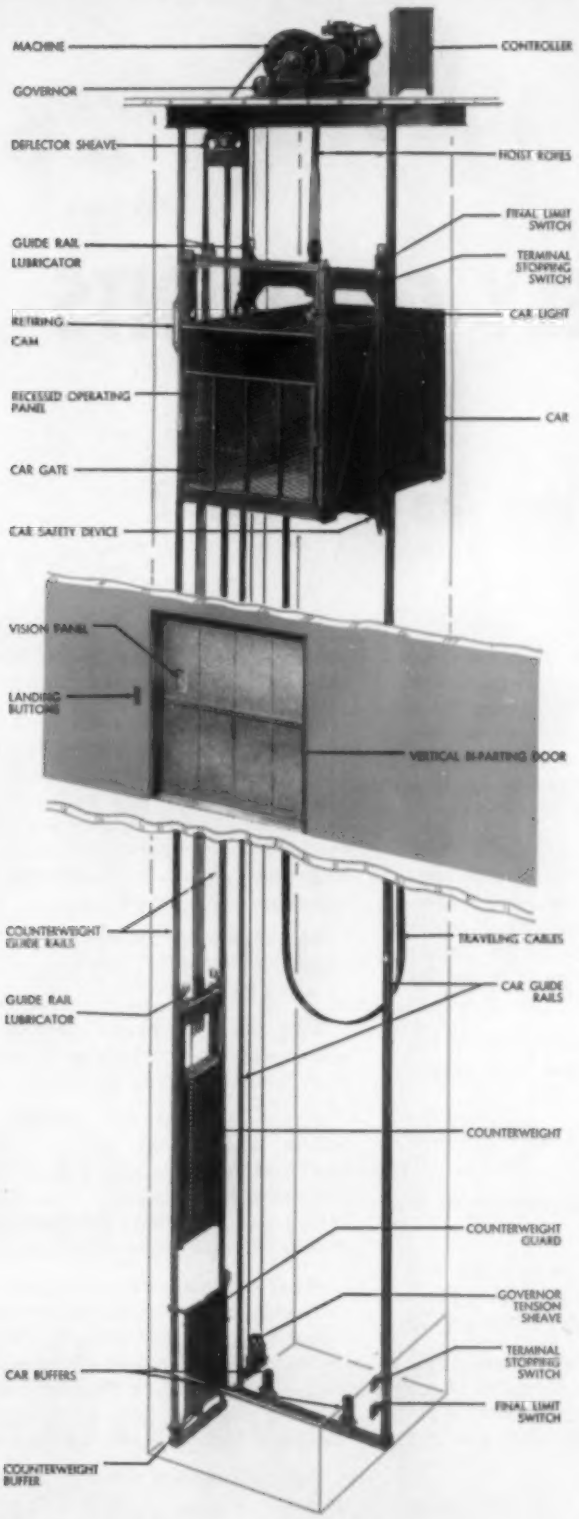
**METHODS:** With more than 40,000 elevators under OTIS maintenance, OTIS has developed an actuarial procedure that replaces wearing parts well in advance of their breakdown point to hold shutdown to an absolute minimum and assure the highest possible safety.

**elevator maintenance**
THAT KEEPS ELEVATORS RUNNING LIKE NEW

Otis

OTIS ELEVATOR COMPANY • 260 ELEVENTH AVENUE • NEW YORK 1, N.Y.
OFFICES IN 297 CITIES ACROSS THE UNITED STATES AND CANADA

# . . . not elevator maintenance men"






For more information, use Reply Card—Page 81

# TIMELY COMMENTS

## Where Are We Headed?

**WE DON'T** know many people that have, or control, money in the volume necessary to construct new manufacturing plants. Such people are all too few in number, but we are thankful they do exist. And we are thankful, also, that they will risk their money on new ventures — otherwise progress would stop.

These brave souls are willing to risk their savings or heritage even in the face of high taxes, high construction costs and high wages. Many of those that supply such capital are of dynamic personality and like to see things grow. But at the same time they like to add to their income.

So the pressure is on, as never before, for cost cutting design features that will permit new plants to show a profit.

Pressure is exerted to produce with less labor in a less expensive plant.

That puts the spotlight on automation — in all its phases.

Things are moving fast and few trends and no standards have yet been set. Each new plant is more "advanced" than its predecessor.

All of these considerations lead to some interesting "star gazing." What will the plant of the future look like? How will it be manned? What will it cost? How will it affect labor and our living standards?

No fully automated plant has yet been built, but one could be. What affect would it have on air conditioning, lighting, transportation, etc.?

There would be no need for parking lots — no people would be driving to work. Lighting could be comprised of portable units, for maintenance only, and little money would be spent for human comfort because normally no people would be in the plant. Air conditioning would be designed solely for equipment and processes rather than for people.

Buildings could be simple and compact, because "comfortable" working space would be unnecessary.

With the constant threat of war, the whole plant might be underground — in a cave. Such plants exist and more are in the planning stage.

It is not likely that anyone reading this article will see the extreme condition just described, but the trend is in that direction. Continued high prices — high wages, high materials and high taxes are speeding too fast in the direction of false economy.

Much of America's success has been built on "extravagance" — fulfilling our desire for many unessential personal items in a buyers' market. Inflation moves us toward the opposite pole — people will clamp down and economize. Then comes a new condition — not necessarily plants in caves, but certainly depression.

Our fight against inflation should be real and earnest.

# CHOOSE N&W COAL

## for all around

# Fuel Satisfaction*

For top efficiency, you need a coal that exactly suits your needs and your equipment. Frequently a minor change in the type of coal you use can result in a major savings.

Regardless of your coal needs . . . whether for heat, power, metallurgy, chemistry, or special purpose . . . there's a N&W coal to meet your specific requirements. Without obligation, a Norfolk and Western coal expert will analyze your needs, suggest any changes that will increase efficiency, and work with you cheerfully in any other way that can be helpful. Just contact one of the bureaus listed at right.

Coals mined along the Norfolk and Western are processed by the most modern methods and dependably transported by the N&W. For export and coastwise use, N&W piers at the Port of Norfolk, on famed Hampton Roads, offer the most extensive, up-to-date coal-handling facilities.

**CONTACT THESE N&W COAL BUREAUS**

**ROANOKE**
N&W Coal Traffic Dept.
Telephone Diamond 4-1451
Ext. 3313, 423, 3249, 3732
Roanoke, Virginia

**BOSTON**
833 Chamber of Commerce Building
Telephone Liberty 2-2229
Boston 10, Massachusetts

**CHICAGO**
660-664 Marquette Building
140 S. Dearborn Street
Telephone RAndolph 6-4634
Chicago 3, Illinois

**CINCINNATI**
913 Dixie Terminal Building
Telephone DUnbar 1-1325
Cincinnati 2, Ohio

**CLEVELAND**
Room 722,
The Illuminating Building
Telephone MAin 1-7960
Cleveland 13, Ohio

**DETROIT**
1514 Book Building
Telephone
WOodward 1-2340 or 1-2341
Detroit 26, Michigan

**ST. LOUIS**
2059 Railway Exchange Building
Telephone MAin 1-1180
St. Louis 1, Missouri

**WINSTON-SALEM**
1105 Reynolds Building
Telephone PArk 2-7116
Winston-Salem 1, North Carolina

**Norfolk and Western RAILWAY**

CARRIER OF FUEL SATISFACTION

* *Fuel Satisfaction* is the name given the many superior all-purpose Bituminous Coals mined along the Norfolk and Western.

# Are You Keeping Up With PLASTICS?

By ARTHUR E. RAEUBER, JR.
and
CHARLES E. FEAZEL

Mr. Raeuber (left) is head of the Plastics Section, Southern Research Institute, Birmingham, Ala. He has been in plastics research and development work for 21 years and has been especially concerned with laminated plastics, industrial finishes, quality control and product design. He has worked for A. O. Smith Corporation, Remington Arms Company, and Tilo Roofing Company.

Dr. Feazel is head of the Applied Chemistry Division of Southern Research Institute and has been in chemical research for 17 years, principally interested in the chemistry of plastics and polymers. He previously worked with the B. F. Goodrich Company and was on the staff of Johns Hopkins University.

**PLASTICS** have grown into a five billion - pound market. The purpose of this article is to point out the variety of uses for plastics and the potential uses they have for the various phases of general industry. We shall not discuss here either the production of plastics or the manufacturing of consumer products.

Industrial plant engineers, by and large, need to re-evaluate plastics, and in many cases change adverse opinions that now may be considered prejudicial in view of substantive improvements made in the past few years. There are now a great many practical applications for plastics in plant maintenance and for equipment and machinery components. In fact, plastics are responsible for completely new techniques and procedures that engineers in all types of industrial operations must quickly learn about.

To begin with, some definitions. The generic term "plastics" refers to a variety of synthetic organic materials. They are organic materials because they are based on carbon compounds, and they are synthetic because they are manmade from sources such as petroleum and coal. The definition of plastics set forth by the American Society of Testing Materials is lengthy but meaningful.

"A plastic is a material that contains as an essential ingredient an organic substance of large molecular weight, is solid in its finished state, and at some stage in its manufacture or in its processing into finished articles, can be shaped by flow."

One key to the rapid growth of plastics lies in the number of large molecular weight organic substances that can be used in them. Another lies in the ability of plastics to be shaped by flow.

Three other terms used in connection with plastics are "resin," "thermoplastic," and "thermosetting." The "resin" is the large molecular weight organic substance that forms the backbone of the plastic. A "thermoplastic" resin is one that can be softened by heat and that, on cooling, will regain its original characteristics. A "thermosetting" resin, when heated, first melts and then sets or solidifies on further heating and cannot be remelted.

From a market of about 100 million pounds in 1934, there has been a tremendous expansion to 2.4 billion pounds in 1950 and 4.3 billion pounds in 1957. The plastics field has a vast potential for companies seeking new and bigger markets. Indeed, every industry should be aware of the potentials that are apparent in this growth industry.

### Key Properties

The general advantages and disadvantages of plastics parts are shown in the accompanying table. For any specific application, the user must weigh the advantages and disadvantages of a plastic compared to another material such as a metal.

The qualities shown in Table 1 are only relative. Plastic nose cones for some guided missiles can

be used successfully because, although the nose cone must retain its strength at high temperatures, the time of exposure is so short that plastics can be used.

Also, it is possible to use alloys of different plastics that combine the best features of each. Sandwich or laminate structures of different plastics can often be used.

Even for any one of the 14 major plastic types, the shortcomings of plastic materials cannot be accurately detailed. Modification of the plastic resins or changes in additives to the formulation result in changes in the properties of the plastic. The skill of the experienced plastics chemist is generally needed to develop the best plastic material for an application.

**TABLE 1**
**KEY PROPERTIES OF PLASTICS**

**Advantages for Some Applications**

- Easy to fabricate
- Lightweight
- Resistant to corrosion
- Electrically insulating
- Thermally insulating
- Transparent
- Variety of colors
- Mechanically damping

**Disadvantages for Some Applications**

- Low in strength
- Dimensionally unstable
- Thermally unstable
- Unstable to light or oxygen
- Odor
- Too expensive

### Types of Resins

Resins are usually classified into 14 major types. The classification is made on the basis of chemical structure. A plastic is made by combining a resin with other ingredients — softeners, pigments, fillers, etc. — and joining the mixture into the desired shape.

The 14 types listed in the following paragraphs include at least 95 per cent of the present commercial resins. In the years of growth ahead for plastics, there will be added to the list additional types of resins that are now in the experimental stage.

Within each type, there is wide variation in properties among the individual resins. This complicates the selection of specific resins to be used in formulating plastics, but gives the formulator a broad range of materials to work with.

### Thermoplastics

*Acrylics.* Chief example is polymethyl methacrylate (Lucite, Plexiglas), characterized by high clarity, easy formability, strength, resistance to weathering. Used in aircraft windows, illuminated signs and lenses.

*Cellulosics.* Example are cellulose acetate, cellulose acetate butyrate, and ethyl cellulose; they are light in weight, fairly strong, and tough. Used in a wide range of colors in toys, tool handles, frames, packaging films, and synthetic fibers.

*Coumarone-indenes.* Widely used in coatings, binders, asphalt tile, rubber articles, and sealing compounds. They have excellent resistance to acids, alkalies and water.

*Fluorocarbons.* Examples are Teflon and Kel-F. They are extremely inert to chemicals and are very heat resistant (to 600 F). Used in gaskets, tank liners, and high frequency insulation. Expensive and difficult to fabricate.

*Polyamides.* Major example is nylon, which is strong, chemically resistant, and gives low-friction wear in machine parts. Widely used in gears, bushings, and wire insulation.

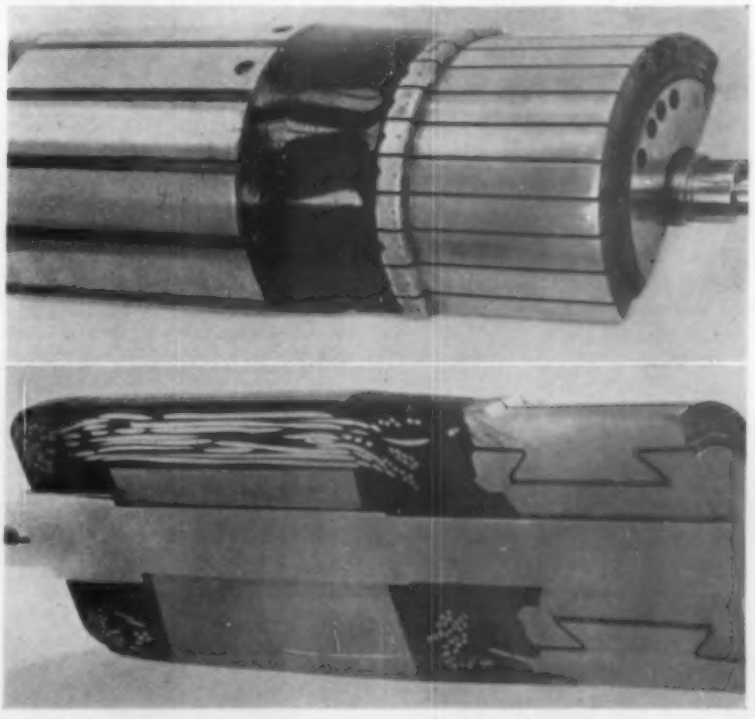
*Polyethylene.* Tough, flexible, chemically inert, readily formable, easily heat-sealed. Used in cable coverings, packaging films, flexible containers.

*Polystyrene.* Clear, easily molded, fairly resistant to chemicals. Poor resistance to weathering. Used in molded toys, boxes, electrical insulators, wall tiles. Modified polystyrenes have good impact resistance.

*Silicones.* Resistant to high temperatures (500 F). Silicone oils are used in high temperature lubricants, water-repellent coatings. Silicone rubbers are used as wire coatings for high temperature use.

*Vinyls.* Tough, flexible, and chemically inert. Easily heat-sealable. Usually plasticized with high-boiling solvents. Used in films, lacquers, moldings, pipe and hose, and wire coatings.

Epoxy resins used in the potting of a d-c motor armature.



### Thermosetting

*Amino resins.* Major examples are urea-formaldehyde and melamine-formaldehyde resins. They have good scratch resistance. The urea resins are used mostly in coatings, adhesives, laminates (knobs and plugs), and as impregnants for paper. Melamine resins are used in plastic dinnerware and as components for electrical equipment where arc resistance is important.

*Epoxies.* Strong, tough, with good chemical resistance. Used in potting electronic components, and in coatings, laminates, castings, and adhesives. Glass fiber reinforced epoxy pipe withstands high pressures and temperatures and exposure to water.

*Phenolics.* Heat-resistant, shock-resistant, high-strength rigid plastics, usually reinforced with paper or fibers. Used in handles, cabinets, panels, and switches.

*Polyesters.* Good resistance to weathering and heat. They are usually reinforced with fibers, and used in structural panels, boats, electrical appliance housings. Some films (Mylar and Videne) are based on polyesters.

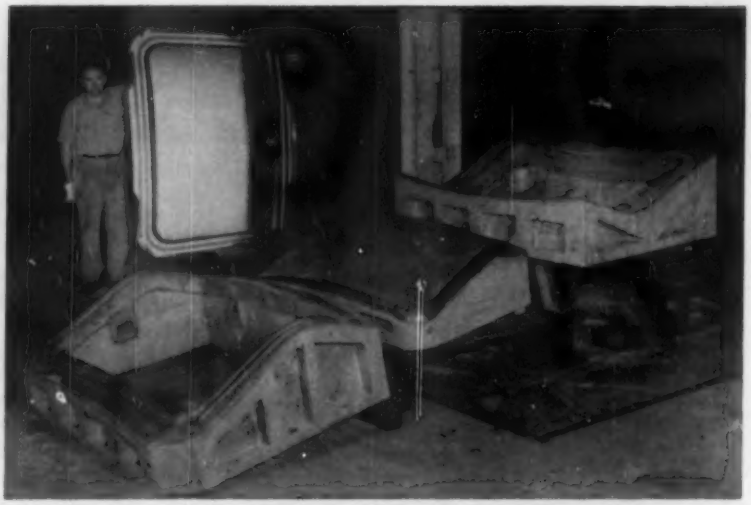
*Polyurethanes.* Both rigid and flexible foamed plastics are based on these resins. The foams are used in thermal insulation. They have good tensile and tear strengths.

### Forming of Plastics

The methods of forming plastics are: molding, extruding, calendering, laminating, coating, and machining. Since most plastics can be fabricated by more than one method, the chief factors in the choice of the fabrication method are the desired shape and properties of the plastic part.

There are many techniques for molding. The mold is usually made of steel and fitted with channels for heating or cooling. Thermoplastics are fed into molds that are cooled below the softening point of the plastic. Thermosetting plastics are fed into heated molds, in which the final curing of the plastic takes place. Products made by molding include appliance components, bottles, housewares, phonograph records, and toys.

Casting is one type of molding, in which a liquid resin, plus other necessary ingredients, is poured into the mold. If a thermoplastic resin is used, the mold is cooled and the molded item is removed. If a thermostating resin is used, the mold containing the mixture must be heated to cure or set the mixture before it is removed.



Epoxy resin compounds used to face huge draw dies for stamping automotive parts from sheet metal.

In extrusion, the thermoplastic is softened and forced through an orifice of the desired shape. Wire insulation, sheet plastic, rods and tubes are made in this way. Synthetic fibers are spun similarly.

Calendering is the process of making sheeting or film by squeezing the plastic between heated rolls. Some plastic floor tile is made in this way.

Laminating refers to either of two processes. In one, films of different plastics are layered and joined by heat or cement. In the other, reinforcing fibers, wood, or paper are impregnated with a liquid resin, heated, and pressed in the desired shape.

In most cases, the forming of plastics requires both special skills and expensive machinery. However, some types of casting and laminating techniques can be easily performed with little equipment. One popular technique for repairing pipes, tanks, and ducts uses hand lay-ups of epoxy resins laminated with glass cloth. Kits of similar materials — glass cloth and polyester resin — are available to the home craftsman for building and repairing pleasure boats. Epoxy resin solders are used to repair automobile bodies. Bonds of epoxy resins to metal are good.

### Electrical Properties

Most plastics are electrical insulators, although some conductive plastics may be formulated. Table 2 lists typical electrical properties of various plastics. Dielectric strengths range from 75 to 2500 volts/mil, and resistances from $10^7$ to $10^{19}$ ohm-cm. Polyethylene and polystyrene have the lowest dielectric loss factors, down to 0.0001 at $10^6$ cycles.

### Industrial Applications

Now let's assume that after reading this article, and with a little product information gained from technical magazines a plant engineer wants to get down to "nut cracking" and try something different. Let's assume that a paper mill maintenance engineer wants to consider plastic repairs for corroded chemical pumps.

Where is he going to find someone to talk with and get started? The answer is not easy. He won't get much help from his local mill supply house or from the many capable mechanical equipment salesmen that normally help him.

And there is not much point in going to see a local plastics processor, because he has only established sources of supply for his own specific requirements and is

not likely to have much knowledge of the broad plastics field.

Perhaps the plant engineer has seen mention of proprietory products in trade magazines that seem to have possibilities. If so, these manufacturers will try to be helpful — and most of them will offer information and suggestions.

But failing to get help from these sources, he may get ideas from an acquaintance in the aircraft or missile field. These people have perhaps had the widest experience, and being new themselves, they are not too inhibited by traditional "can't do its."

The company purchasing agent may have already established contact with capable plastics salesmen. And certainly he will have directories such as "Mechanical Catalog," published by American Society of Mechanical Engineers, and the well-known Thomas Register. Both of these list a number of manufacturers under various headings such as: plastic pipe, adhesives, protective coatings, etc.

Starting from scratch, however, the best source will be the large chemical companies that manufacture the basic plastics and sell to others for compounding and resale to the trade. They supply the paint people, the pipe people, and the adhesive people, and others that offer proprietory products for sale to the consumer.

Therefore, such companies as duPont, Bakelite, Monsanto, Dow, and Shell can nearly always give assistance toward gathering experience and research information.

Here is a short list of such companies with their home offices, and their Southern District sales offices. Telephone books in other large cities such as Dallas, Houston, New Orleans, St. Louis and Louisville will list other district offices.

*American Cyanamid Company*, Plastics and Resins Division, 30 Rockefeller Plaza, New York 20, New York, and 3333 Wilkinson Boulevard, Charlotte 8, North Carolina.

*Bakelite Company*, 30 East 42nd Street, New York 17, New York, and 611 Healy Building, Atlanta 3, Georgia.

*Dow Chemical Company*, Midland, Michigan, and 1714 Fulton National Bank Building, Atlanta 3, Georgia.

*E. I. du Pont de Nemours and Co., Inc.*, Polychemicals Department, Wilmington 98, Delaware.

*Eastman Chemical Products, Inc.*, Kingsport, Tennessee.

*Goodyear Tire and Rubber Company, Inc.*, Akron 16, Ohio, and 2755 Piedmont Road, N. E., Atlanta, Georgia.

*Koppers Company, Incorporated*, Chemical Division, 7th and Grant, Pittsburgh 19, Pennsylvania, and 1029 Healey Building, Atlanta 3, Georgia.

*Monsanto Chemical Company*, Plastics Division, Monsanto Avenue, Springfield 2, Massachusetts, and 1401 Peachtree Street, N.E., Atlanta 5, Georgia.

*Reichhold Chemicals, Incorporated*, 630 5th Avenue, New York 20, N. Y.

*Rohm and Haas Company*, Washington Square, Philadelphia 5, Pennsylvania, and 1430 Peachtree Street, N.W., Atlanta 9, Georgia.

*Shell Chemical Corporation*, 50 W. 50 Street, New York 20, New York, and 55 Marietta Street, N.W., Atlanta 3, Georgia.

**Table 2. Typical Electrical Properties of Molded Plastics**

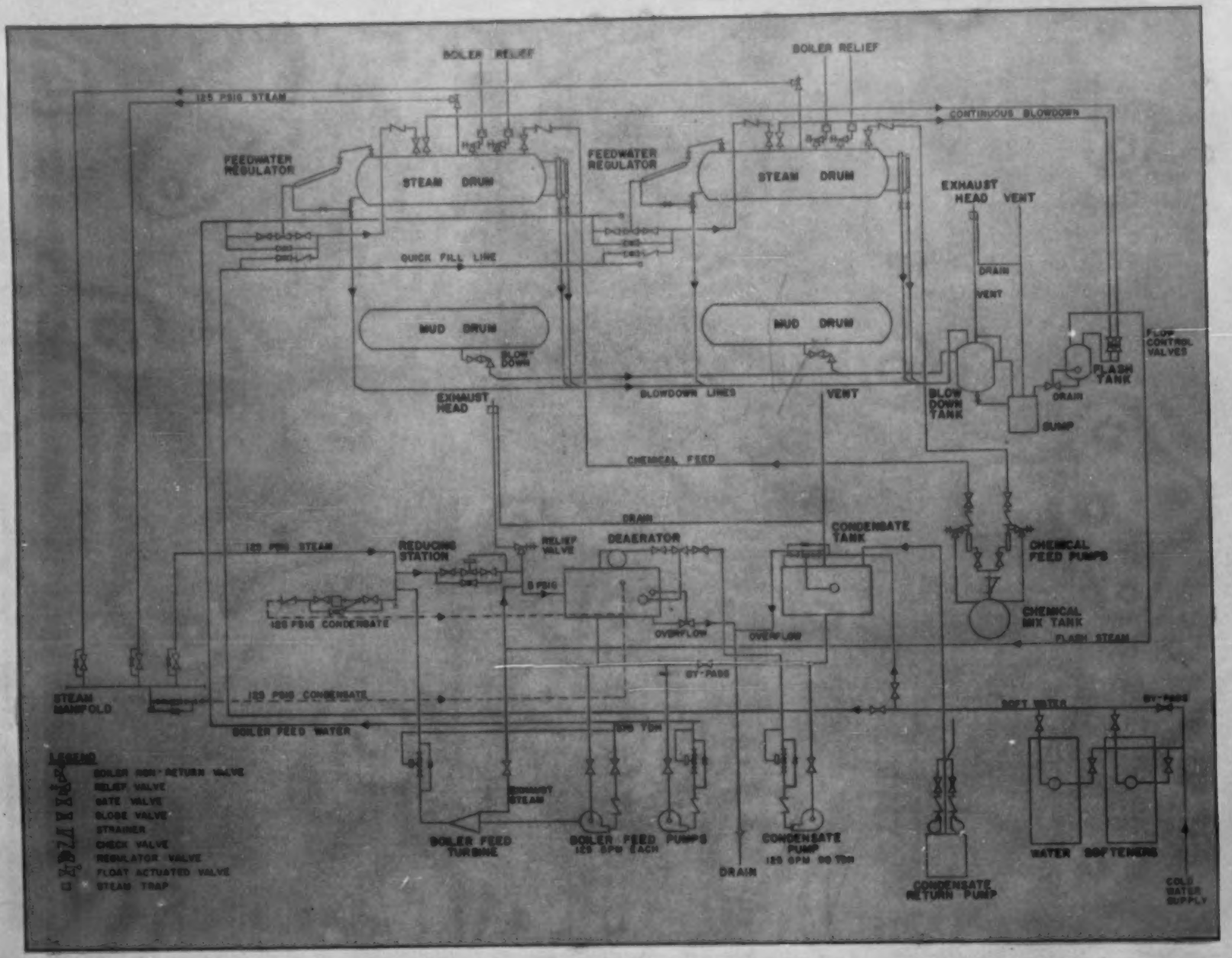
| Type of Plastic | Dielectric Strength volts/mil | Insulation Resistance ohm-cm | Dielectric Constant $10^6$ cycles | Dielectric Loss Factor $10^6$ cycles |
|---|---|---|---|---|
| Acrylic | 500 | $10^{15}$ | 2.8 | 0.1 |
| Cellulosic | 200 - 500 | $10^{11}$ - $10^{14}$ | 3.0 - 7.0 | 0.01 - 0.6 |
| Fluorocarbon | 480 - 2500 | $10^{18}$ | 2.0 - 2.3 | 0.0004 - 0.04 |
| Polyamide | 350 | $10^{14}$ | 4.2 | 0.03 - 0.30 |
| Polyethylene | 490 - 700 | $10^{16}$ - $10^{17}$ | 2.3 - 2.4 | 0.001 |
| Polystyrene | 300 - 500 | $10^{16}$ - $10^{19}$ | 2.5 - 4.0 | 0.0001 - 0.02 |
| Silicone | 125 - 400 | $10^{7}$ - $10^{15}$ | 3.6 - 5.0 | 0.003 - 0.006 |
| Vinyl | 300 - 1200 | $10^{11}$ - $10^{16}$ | 3.0 - 4.0 | 0.06 - 0.50 |
| Amino | 150 - 350 | $10^{9}$ - $10^{14}$ | 4.7 - 8.2 | 0.03 - 0.30 |
| Epoxy | 380 | $10^{16}$ - $10^{17}$ | 3.5 - 3.8 | - 0.02 |
| Phenolic | 75 - 450 | $10^{7}$ - $10^{14}$ | 4.0 - 7.0 | 0.005 - 0.50 |
| Polyester | 200 - 400 | $10^{12}$ - $10^{14}$ | 3.0 - 6.0 | 0.15 - 0.20 |

Epoxy resin reinforced with Fiberglas cloth used to patch an automobile fender.

*Editor's Note:*

*The editors particularly desire to publish field reports on use of plastics for maintenance in Southern and Southwestern plants. Usual payments will be made for accepted articles.*

*A glossary of plastics terms is available through the courtesy of Phillips Chemical Company. Write the editors of Southern Power and Industry, 806 Peachtree St., N.E., Atlanta 8, Ga.*


BOILER RELIEF
BOILER RELIEF
125 PSIG STEAM
CONTINUOUS BLOWDOWN
FEEDWATER REGULATOR
STEAM DRUM
FEEDWATER REGULATOR
STEAM DRUM
EXHAUST HEAD VENT
QUICK FILL LINE
DRAIN
VENT
MUD DRUM
MUD DRUM
FLOW CONTROL VALVES
BLOW DOWN
FLASH TANK
DRAIN
BLOW DOWN TANK
SUMP
EXHAUST HEAD
BLOWDOWN LINES
VENT
CHEMICAL FEED
DRAIN
125 PSIG STEAM
REDUCING STATION
RELIEF VALVE
DEAERATOR
CONDENSATE TANK
CHEMICAL FEED PUMPS
5 PSIG
125 PSIG CONDENSATE
OVERFLOW
OVERFLOW
CHEMICAL MIX TANK
FLASH STEAM
BY-PASS
STEAM MANIFOLD
125 PSIG CONDENSATE
SOFT WATER
BY-PASS
BOILER FEED WATER
DRAIN
EXHAUST STEAM
BOILER FEED TURBINE
BOILER FEED PUMPS
125 GPM EACH
CONDENSATE PUMP
125 GPM 90 TDH
DRAIN
CONDENSATE RETURN PUMP
WATER SOFTENERS
COLD WATER SUPPLY
LEGEND
BOILER NON-RETURN VALVE
RELIEF VALVE
GATE VALVE
GLOBE VALVE
STRAINER
CHECK VALVE
REGULATOR VALVE
FLOAT ACTUATED VALVE
STEAM TRAP

By DENARD L. GUSLER

Professional Engineer
Clark, Buhr & Nexsen
Architects - Engineers
Norfolk, Virginia

# GOOD DESIGN PAYS

# Even if the Plant Is Small . . . . . .

**THE DESIGN** of a small, industrial steam plant merits the same careful analysis and attention to detail normally accorded large plants costing millions of dollars. However, it is next to impossible to find a small plant that is adequately designed with equipment arrangements and appurtenances that are necessary for efficient operation.

**THERE ARE** several reasons why the small steam plant design is neglected. The prime reason being the reluctance of owners of industries requiring small plants to pay adequate fees to engage qualified professional engineers to do the necessary design work. The results often leave much to be desired.

This article will attempt to illustrate how a small steam plant can be properly designed. Consideration will be given to major plant equipment and arrangements rather than detailed engineering design.

Because this article will deal primarily with selection and application of equipment, it will be assumed that necessary engineering attention has already been given to such basic features as: plant location, water supply and choice of fuel. However, it should be emphasized that correct decisions on these basic elements are extremely important.

Choice of fuel particularly deserves thorough study, and "quickie" decisions based on ease of design and minimum attention are not likely to lead to maximum long-range economy. Where dependable supplies of competitive fuels are available, designs must be studied in view of economies available from most modern burning equipment for each fuel.

While the plant described here burns fuel oil, this is not intended to indicate a fuel preference. Choice would have to be based on thorough engineering analysis for the actual location and the specific plant requirements.

For the purposes of this article a steam heating load requirement of 60,000 pounds per hour at 125 psig is divided between two boilers each rated at 30,000 pounds per hour. A typical flow diagram for the boilers and related auxiliaries is shown in Figure No. 1.

We will start our discussion with the water entering the plant and progress to the final stage where steam leaves the plant.

**STEP 1** — The make-up water to the plant should be analyzed by a competent engineer who can make recommendations to the design engineer concerning the method of treatment to be used.

The treatment selected for the plant discussed here employs water softeners of the zeolite type. The softeners are fully automatic with the softeners and related auxiliary equipment located in one corner of the bottom floor of the boiler room. The compact arrangement is shown in Figure No. 2. Note that the auxiliary equipment and valves are readily accessible.

The treated water is piped to a float actuated make-up valve with a three-valve by-pass and strainer connected to the condensate return tank located on an upper level of the boiler room. The upper level is constructed of high visibility steel grating as shown in Figure No. 2 and other pictures in the series accompanying this article.

The water softener is of liberal size for the quantity of make-up to be treated. A by-pass is provided around the water softeners to be used in the event of emergency such as failure of the softeners or the condensate return system. A line is also provided to each boiler steam drum for quick fill of the boilers after an emergency or maintenance outage.

**STEP 2** — Size the condensate return tank and locate it on an upper level of the boiler room to create a positive head on the condensate pump. A condensate tank supported by a structural steel framework is shown at the extreme left rear of Figure No. 3.

For the plant under consideration the condensate pump is rated at 125 gpm 90 tdh and located on the lower level of the boiler room. This is the small pump in the front center of Figure No. 4.

The condensate tank is sized for 1200 gallons capacity and provided with a low level indicating light and alarm horn on the main boiler control panel. After the alarm sounds the operator has about 5 minutes in which to operate the by-pass on the float controlled softwater make-up on the water

Fig. 1. Flow diagram.

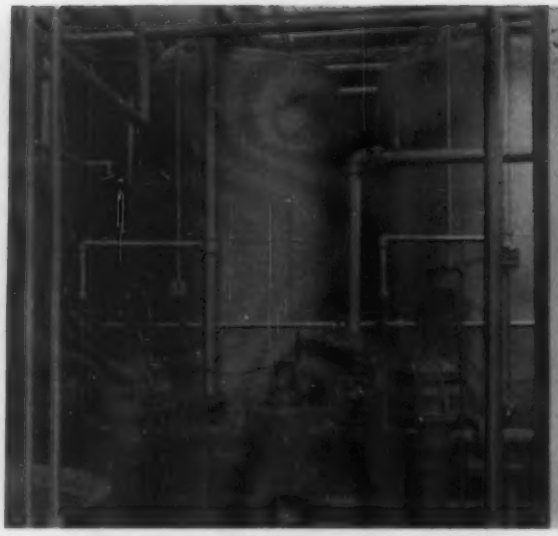


Fig. 2. Water softener.

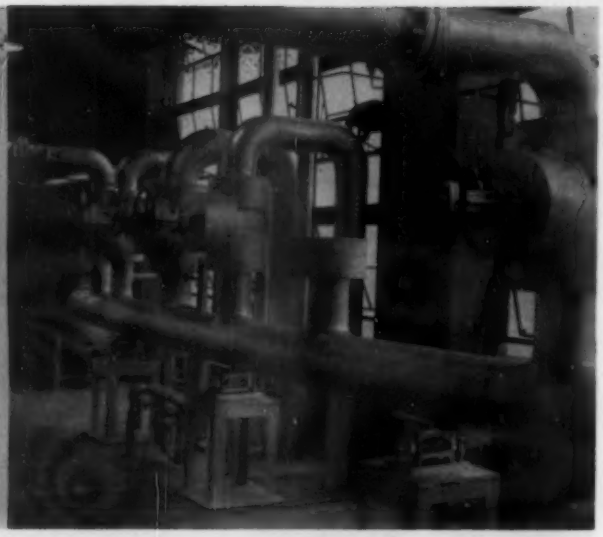


Fig. 3. Steam distribution manifold.

softeners or take other remedial action.

The condensate pump is operated continuously, pumping water to the deaerator through a float actuated valve clearly visible at the side of the deaerator shown in Figure No. 5. The condensate tank is provided with a vent to the roof and overflow to the sewer.

**STEP 3** — Size the deaerator and locate it on an upper level with the condensate return tank as shown in Figure No. 5.

The size selected for the plant under consideration is 60,000 pounds per hour of boiler feedwater heated by steam at 5 psig to provide 227.14 degree feedwater. The height of the deaerator above the boiler feed pump is sufficient to prevent the possibility of flashing in the pump suction which might result in pump cavitation and possible loss of suction.

A low level indicating light and alarm horn is located on the main boiler control panel. Sufficient reservoir capacity is provided in the deaerator to allow the boiler operator about two to three minutes in which to take remedial action. A common manifold is provided beteen the condensate tank suction and the deaerator suction with a by-pass valve so that in the event of failure of the deaerator the boiler feed pumps can take suction directly from the condensate tank.

**STEP 4** — Provide two boiler feed pumps and size each for the total amount of boiler feedwater required. Make one pump electric motor driven and one pump steam turbine driven.

For the plant under consideration one pump is rated at 125 gpm, 370 tdh, 25 hp and the other pump with the same rating is equipped with a turbine drive rated at 125/5 psig.

The water rate on the turbine is 35-40 lb/bhp which provides about 1000 lbs of steam per hour for heating the feedwater in the deaerator. The turbine exhaust is equipped with a multiport relief valve and piped to supply steam to the deaerator, as shown in Figure No. 5.

The remaining steam for heating in the deaerator is supplied from a 125/5 psig reducing station equipped with a three-valve by-pass. The electric driven boiler feed pump with its feedwater regulator is shown at the rear of Figure No. 4 with the steam turbine driven pump at the left out of sight behind the boiler.

**STEP 5** — A blowdown tank should be provided to which should be connected all boiler mainfold, mud drum, water column, and gauge glass blowdown piping.

As shown in the piping diagram of plant under discussion, the drain from the blowdown tank is piped to a suitable sump and vented to the top of the building. An exhaust head is provided at the top of the vent with a drain piped to the blowdown sump. The blowdown sump has sufficient retention time to prevent hot water causing cracks in the storm drainage piping to which it is connected.

**STEP 6** — A flash tank should be provided as shown in Figure No. 5 and the diagram.

The continuous blowdown from each boiler-steam drum is connected to a manifold and equipped with a calibrated flow control valve. The continuous blowdown flash tank is provided with a float actuated drain to a suitable sump. The steam flashed from the hot blowdown is piped to the deaerator for feedwater heating. The blowdown flash tank is provided with an alarm to give a warning in the event of failure of the drain.

Also shown in Figure No. 5 adjacent to the flash tank is a water sampler - cooler arrangement for taking samples of the boiler water for analysis. The cooler is located above a soapstone sink and cabinet containing the necessary equipment for feedwater testing. The tests performed are purely routine and can be made by any operator after a brief period of

training. These tests are necessary for the proper feed of chemicals into the boiler steam drums, and for determining rate of blowdown.

**STEP 7** — Adequate control of the quantity and quality of feedwater is essential.

In the plant under consideration a chemical mixing tank for chemical make-up to the boilers is provided on the upper level with proportional type chemical feed pumps as shown in Figure No. 3 just in front of the condensate tank. Each boiler steam drum is connected to an individual adjustable stroke pump.

The boiler feedwater is analyzed daily and the stroke of each pump is adjusted for the proper rate of chemical feed. The chemical mixture is varied periodically as determined by boiler water analysis and internal inspection of the boiler drums and tubes. Each pump is provided with a relief valve connected back to the mixing tank. The mixing tank is provided with a tangential water make-up connection and a motor driven agitator unit.

The feedwater to each boiler is controlled by a thermally actuated regulating valve that responds to change in boiler water level. Constant pressure is maintained on the primary side of the feedwater regulator valve by the boiler feed pumps. This differential compensates for loss of pressure through the valve and related piping. The entire feedwater level control assembly is located on the upper level to provide manual access to all valves and related appurtenances.

Fig. 4. Control panel, oil pumping and heating assembly, condensate pumps, and feed pumps.

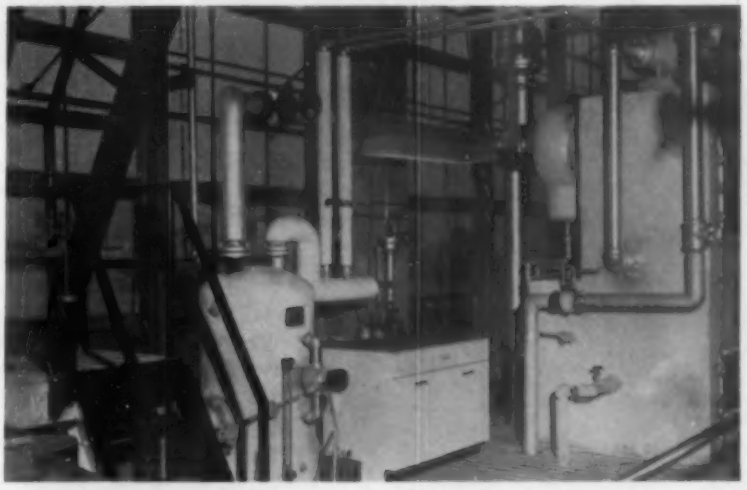


Fig. 5. Constant blowdown tank, heater and deaerator, and water heating equipment.

**STEP 8** — Size the forced draft blower unit for each boiler and locate it on the lower level at the side or back of the boiler to which it is connected.

The size selected for the plant under consideration is 46,000 lb air/hr, 4.0 inches spwg, at 80 F entering air, 20 hp. In order to minimize the space requirements a vertical axial blower unit was selected and is installed as shown in Figure No. 6. Also visible in the picture is the vane control linkage and device used to modulate the quantity of combustion air supplied to the boiler.

**STEP 9** — Size the induced draft blower unit for each boiler and locate it on an upper level of the building structure.

The size selected for the plant under consideration is 63,000 lb gas/hr, 4.9 inches spwg, at 600 F entering gas, 30 hp.

In order to minimize the space requirement and to effect a considerable reduction in building cubage the induced draft blower units are located on the roof of the boiler plant as shown in Figure No. 7. An access ladder is provided to the roof as shown in Figure No. 5 so that the boiler operator can periodically check the blower units.

**STEP 10** — Size and select adequate automatic fuel handling equipment suited to the type of fuel burned. Any necessary refuse disposal equipment should also be mechanically operated.

The fuel oil heating and pumping set selected for the plant under consideration is located on the lower level of the boiler room as shown in Figure No. 4. There are two electric pumps and one steam pump rated at 10 gpm each and

Fig. 6. Forced draft fans and electrical control.

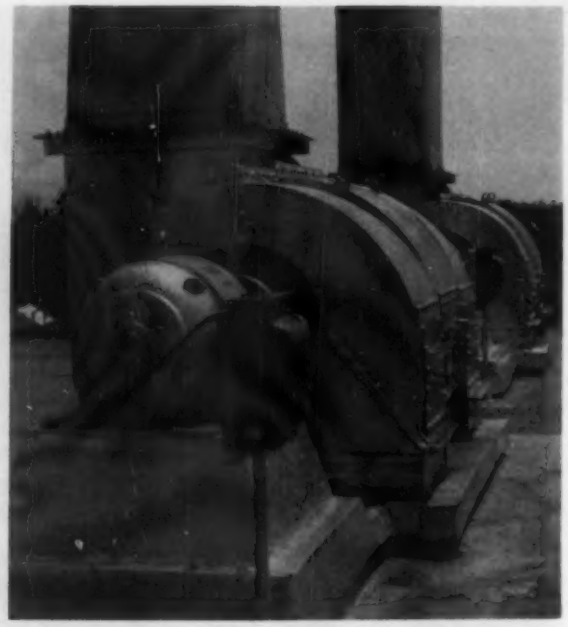


Fig. 7. Induced draft fans.

three oil heaters rated at 800 gph each 80 F - 225 F.

**STEP 11** — A dependable supply of electricity for operating plant auxiliaries is essential. Normally such power is available for other industrial operations and may readily be connected to a center in the steam plant.

All electric power for operating auxiliaries in the plant discussed is concentrated in the motor control center shown in Figure No. 6. Motor starters for main boiler auxiliaries are located in the motor control center. They are equipped with hand-off-automatic switches and connected to pushbutton stations with indicating lights located on the main combustion control panel.

The motor control center also contains a transformer section rated at 15 kva, 480/115 volts connected to a lighting panel and a utility panel all contained in the motor control center. The combining of all secondary electrical distribution in a single motor control center is economical, space saving, and convenient for the boiler operator.

**STEP 12** — The expenditure that can be justified for instruments and control equipment is to considerable extent dependent on the price and type of fuel.

For the plant we are using for illustration, the combustion control panel is centrally located between the two boilers as shown in Figure No. 4. The following essential instrumentation is contained on the board:

Time Clock.

Steam manifold pressure gauge.

Boiler feed pump pressure gauge.

Condensate pump pressure gauge.

Windbox pressure, furnace draft, and uptake draft gauges for each boiler.

Boiler steam drum pressure gauge for each boiler.

Deaerator high-normal-low indicator lights and alarm.

Condensate tank high-normal-low indicator lights and alarm.

Steam flow meter assembly including indicating, intergrating, and recording of steam flow. Indicating and recording flue-gas temperature and boiler steam pressure for each boiler unit.

Master steam pressure automatic controller.

Fuel oil ratio controller for each boiler.

Induced draft fan controller for each boiler.

Pushbutton stations and indicating lights for boiler feed pump, condensate pump, oil pumps, forced draft fans, and induced draft fans.

All control devices and indicating instruments are provided as necessary to enable the boiler operator to have visual awareness and physical control of all major equipment and related auxiliaries. Steam lines from the boiler drums and lines for distribution outside the boiler plant are grouped together and connected to a single manifold on the upper level as shown in Figure No. 3. All valves are grouped for ease of operating at shoulder height on the upper level.

**STEP 13** — Modern economical equipment is applicable to operation in most any type of enclosure, or even outdoors. Therefore, choice of the building type depends largely on the environment and personal preferences of the owners.

The completed building that houses the equipment previously described has a knockout wall for future expansion and also encloses the machine shop, the transformer room, toilet, and office. Above the one story section are two square openings in the wall in which are

installed exhaust fans for boiler room ventilation.

There is nothing unique or outstanding about this particular plant. It is a simple design utilizing standard commercially available equipment conveniently arranged with all necessary piping, valves, fittings and appurtenances for completely automatic, highly efficient operation. It is the sort of design that can best be performed by a professional engineer selling services to the client and not a product.

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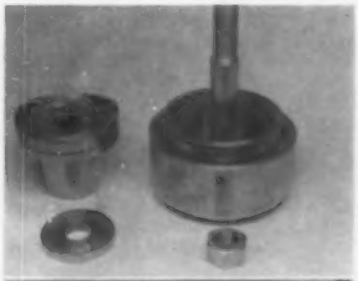
# Cutter for Tough Jobs



CUTTER ASSEMBLY — outside cutting face, inside cutting face, pilot stud, nut, washer and tool holder. Cutting faces were made from inner races of discarded truck bearings.

ASSEMBLED TOOL — note that the outside cutter can be adjusted to fit the inside cutter by means of 3 set screws positioned equi-distant in the tool holder sides.

CLEAN-CUT HOLES made by the tool in the top of stainless steel yarn boxes. A conventional hole saw would not perforate the tough stainless steel.

**WE** recently had a number of large holes to cut in stainless steel boxes constructed of thin sheets, but could not find a conventional hole saw that would cut the tough metal; neither could we find a cutting tool large enough to cut holes the size required for this particular job.

After some deliberation, we finally decided to design a cutting tool for our own use, using discarded truck bearings to make the outside and inside cutting faces.

Dimensions of the cutter are as follows: Outside diameter of inside cutter is 2-13/16", total height of the two cutting lips which rise to a peak on opposite sides of cutter face is ⅞", height of shallow sides of cutter face is 7/16", and the inward slope of cutting edges is nearly 30 degrees.

The inside cutter was sweated onto an adapter, which in turn fits very snugly over a ¾" pilot stud; the pilot stud is 4⅛" long plus 1⅜" for ⅝"-18 threads, making a total length of 6". The pilot stud is firmly centered in the outside cutting tool by being screwed into the outside cutting tool holder base. It is essential to use a heavy washer under the nut to prevent binding when in use.

The outside cutter, which has an internal diameter of 2-13/16", is held firmly in place in the cup-like tool holder by means of three ¼" set-screws placed equi-distant on its outside periphery, and are a means of aligning the inside and outside cutters. Actually, it is desirable to have several thousandths inch clearance between the cutters, rather than having too close a tolerance.

In applying the tool to the cutting operation, first a ¾" hole is drilled in the metal to accommodate the pilot stud; the pilot stud is next inserted in the hole from bottom to top, and the inside cutter is dropped over the pilot stud from the top side; next, the washer and nut are placed in position and tightened with a ratchet type socket wrench. If the tool has been correctly sharpened and aligned in assembling, a clean-cut 2-13/16" disc will be removed, thereby leaving a clean hole free from burrs.

Specifications or sizes of this shop made cutter may be varied to suit the job at hand. A junk yard is the logical source of supply for the discarded bearings used in making the inside and outside cutters. — *By SAM BOYER.*

***The Grapevine Is Fast, Furious and Frustrating***
***Adequate Communications Help Keep Good Men Working . . . . . .***

# THE LEFT OUT HELPER

**By JOE TABB**
**Macon, Georgia**

JOSEPH L. TABB, JR. has had over 10 years training experience in diverse business and industrial fields — warehousing, merchandising, metalworking, textiles, pulp, paper, and building supplies. His educational training includes Emory University and the U. S. Army and Air Force Schools of Personnel Administration.

**ROCKY STONE** was the type of foreman who conscientiously tried to apply every known technique of good supervision. Top management people thought of him as one of their most efficient and loyal team members. His workers spoke of him as a "good Joe."

One thing Rocky was especially careful about was to keep his group informed of any job information or work regulations he gathered that might be of interest to them. Several times during the earlier days with the company he had been a little slow about giving the word. He had found that being scooped by the grapevine was not so good.

On the Friday afternoon when the big layoff was discussed in the superintendent's office, there appeared to be a great amount of tension among all of the employees in the plant. Rumors had been going around since the cutback in production. It was an open secret that at least one production line would have to be shut down.

When Rocky got back to his area he lost no time in telling his people just where they stood. After all, he had better news than most of the foremen. Because of a special overhaul project, all of his crew were to be kept on the job.

Since it was late in the day, Rocky hurriedly went from one work station to another giving each worker the good word. This time, he was certain that he had beat the grapevine.

There was just one hitch.

Hank Henry, helper on the number two machine, returned from the tool room while Rocky was making his round. He noticed that Rocky was talking to first one, then another of his employees. Hank wondered what it was all about but got busy cleaning up his machine and forgot about it for the moment.

After work Hank joined his buddies in the car pool. This car pool was made up of a typist from the personnel department, a clerk from accounting and a couple of fellows from a production department near Hank's. The entire topic of conversation was the big layoff. No one appeared to know much about the details, but the personnel typist fed in a lot of mystery and

insinuations about a real rough deal.

On Monday morning when Hank called Rocky and asked for emergency leave to "take care of urgent personal business" no questions were asked. After all, Hank was one of Rocky's best men and he saw no reason to question his personal business.

Tuesday, soon after the morning break, Hank walked into Rocky's office and told him that he was quitting. When Rocky got over his initial surprise and asked why — he got it.

Hank blew his top.

Among other things, he told Rocky that he'd found out what was going on — that in spite of the fact that he'd heard over the week-end about the special overhaul project, that he knew he was marked to go — why else would all of the other people on the line be told where they stood except him — and besides, he'd found another job while off the day before.

In the heat of the discussion neither of the men remembered the tool room incident. In fact, Rocky insisted that he had told Hank what was to happen — and believed that he was right.

Rocky tried to reason and explain, but it was no use — Hank had already quit.

## DISCUSSION —

This is one of the little tempests in a teapot that are irritating but about which supervisors are prone to say, "What can I do?" The fact is, this situation is not as simple as it may appear. It involves *communication*, one of the toughest problems in management.

Take a look at these points:

1. Here is an example of a valuable employee being lost to the company. (At least, Rocky thought enough of him not to question his absence when he called in for emergency leave.) Regardless of the fact that Hank may have failed to use logic, the company had the expense of a replacement. In addition to this cost, the new man may not be as good a worker as Hank.

2. Regardless of the true facts, people act on the basis of what they *believe* and feel to be the truth. Injured feelings may be kept under cover. However, when security, pride, and the feeling of belonging appear to be threatened it is plain human nature to react with emotion. Assumed wrongs become just as serious as the real thing.

3. It has been said that the car pool is the most effective media for communication in any company. This may be an exaggeration — the same may be said of the powder room in the front office. The point is that informal groups of all kinds, such as car pools, lunch groups, athletic teams, and others play a tremendous part in grapevine communication. They may not be accurate, but they are FAST.

4. A good supervisor, with the best intentions, can defeat his purpose by a slight oversight. Such slight oversights are one of the most frequent causes of failure in communication.

## HINDSIGHT —

Looking back, this situation could have been avoided if either Rocky or Hank had used a little more foresight:

1. Hank could have questioned what was going on. Employees have a responsibility to ask questions rather than go off on a tangent. However, supervisors have an equal responsibility to encourage questions. A part of effective training is to urge employees to ask questions when in doubt, and to convince them that such questions are really welcome.

2. Rocky was obviously trying to do a good job in getting the word to his people. His efforts could have been much more effective if he had used some system of checking himself to insure complete coverage. If it had not been Friday afternoon and time had permitted, a written bulletin probably would have been in order. At least, a check list could have saved the situation. Some may say that these things are needless detail work, but it is the kind of detail that turns hindsight into foresight.

## CONCLUSIONS —

The pressure of normal work routine makes an oversight easy when a special situation comes to our attention. *Communication cannot* be taken for granted. This is especially true when the information pertains to job security.

It is not merely what we think, or even what we say that counts — what is *understood* and *acted upon* reflects the true meaning of a communication.

# Hoppers Speed Shipping

**SELF-DUMPING** hoppers used for transporting lump and crushed ferro alloys have speeded up processing and shipping operations at the Roane Electric Furnace Plant of Tennessee Products & Chemical Corporation in Rockwood, Tenn.

The plant produces a variety of ferro alloys for use by the steel, foundry and aluminum industries. The metal is cast into slabs or ingots which are then broken into lumps of varying sizes and moved by cranes to stockpiles.

Since most orders call for material of a specific size, pieces are picked from the stockpiles by hand and placed in hoppers for shipment or for further processing. Loaded hoppers are carried by fork truck to crushers or to an outside railroad siding for loading.

Emptying a hopper takes but a few seconds. When a lock handle on the rear is released the hopper tilts forward to dump and then

Workers pick 75 lb x 2" pieces of ferro alloy from stockpile to fill customer order. Pieces are placed in hopper which is carried by fork truck to rail siding.

Hopper is emptied into gondola car spotted in depressed siding. When lock handle on rear is released, hopper tilts forward to empty, then returns to upright position and automatically locks.

Empty hopper is returned to stockpile for re-filling.

## Tennessee Products & Chemical Corporation, Rockwood, Tennessee

returns to an upright position and automatically locks, ready to return for another load. This feature not only speeds the dumping operation, but eliminates many of the safety hazards present with the old skip pans, which necessitated the driver's getting off the truck to hook up the skip for dumping.

In addition to the safety features, the manner in which the hoppers dump also allows higher piling of material in box cars, thus eliminating any labor for loading other than the fork lift operator.

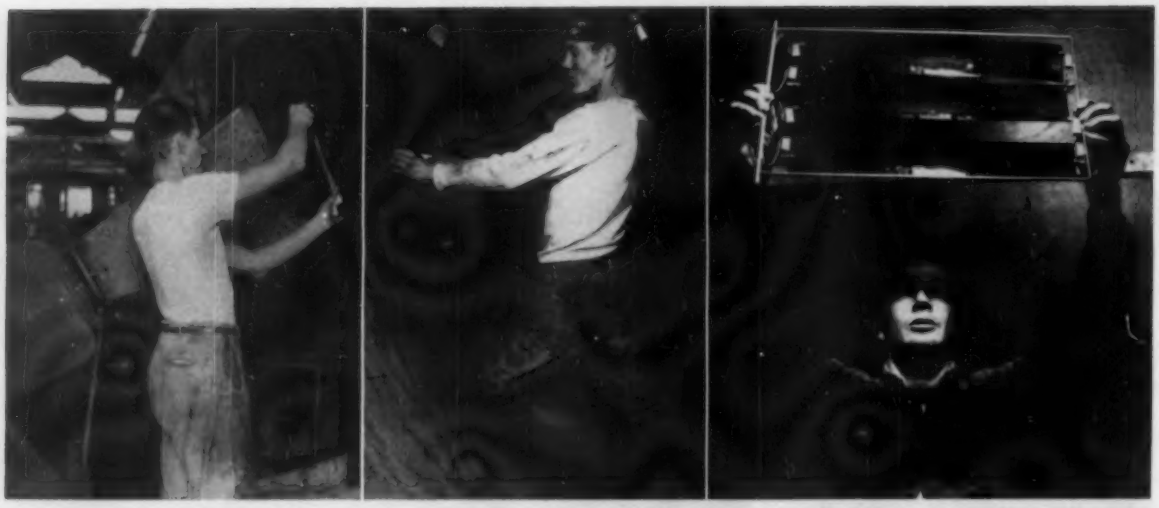
On orders for crushed ferro alloys, the material is sent through a crusher and collected in a hopper. Crushed material is emptied into railroad cars in the same manner as lump material. The hoppers handle both lump and very fine material without spillage, thus preventing loss of product and easing the housekeeping duties.

Tennessee Products uses 25 hoppers for handling shipments and for hauling material from one area to another within the plant. All were specially fabricated by Roura Iron Works, Inc., with manganese steel bottoms to provide extra protection against the abrasiveness of the heavy material. The hoppers require very little maintenance.

Crushed material is collected in hopper for trip to rail siding. Tennessee Products produces ferro alloys in dozens of different sizes for steel mill and foundry customers.

Roura hoppers are narrow enough to move easily through boxcar doors.

Since the hoppers can be raised for dumping, matt material can be piled high in rear of boxcars without manual labor.



Creamer and Dunlap, Inc., Tulsa, Oklahoma, manufacturer of pressure vessels saves hundreds of dollars per unit by using latest radiographic inspection technics and high speed x-ray film. Shown at left, an x-ray camera operator applies a strip of tape containing lead numbers denoting job and seam on section of tank to be radiographed. The x-ray machine is already in position. Rollers underneath rotate the tank during welding and x-raying.

While the x-ray operator is positioning the elements outside the tank, worker inside the tank positions the x-ray film.

R. W. Creamer, vice-president of Creamer and Dunlap, checks x-ray films as they dry under infra-red heat. A proficient amateur photographer, Creamer takes an active interest in the x-ray set up.

# PHOTOGRAPHY . . .

# An Engineering Tool

**BIG PROBLEMS** of men that must manage the South's rapidly expanding industrial facilities lie in the broad fields of building factories and training people. Photography is becoming a key, too, in many phases of design, erection, maintenance and instruction.

### Engineering Drawings

Businessmen in the region can look forward to spending an unusually heavy portion of their time and money on construction plans, revisions of plans, modified plans, new plans substituted for plans which have been discarded, etc.

In an era of new building, or of introducing new products, the drawing of engineering and manufacturing plans can be an especially burdensome overhead item for a company. Photography, in the right situations, can help cut the cost of producing and reproducing engineering drawings to a fraction of the expense of hand drawing methods. Photomechanical methods are also quick and accurate.

During the last few years in particular, new materials and equipment have been developed which bring new flexibility and cost savings to the field of engineering drawing reproduction.

### Case 1 — Charlotte, N. C.

For example, a saving of an average of four hours of drafting time per drawing is reported by B. O. Vannort Engineers, Inc., of Charlotte, North Carolina. This firm of electrical engineers specializes in the design and building of electrical power systems. The firm operates in 17 states east of the Mississippi. Frequently, standard wiring drawings specified by the customer have to be worked into the plans for a system which Vannort is designing.

The Charlotte firm has cut drawing preparation time for this phase of its work to less than half of what it used to be by adapting an office copier which was on hand anyway for duplicating routine correspondence. The unit is a Verifax Copier. In just one minute per copy, Vannort now produces positive translucent duplicates of the standard drawings. These

copies have all the properties of hand-drawn masters. They can be erased and altered and, of course, reproduced on diazo reproduction equipment. Vannort simply splices these Verifax copies into system drawings, saving many hours of valuable drafting time.

### Case 2 — Construction

The same type of office copier is also valuable in many cases for the reproduction of specification sheets which must accompany large drawings or blueprints. It is a standard procedure to reproduce spec sheets by the Verifax methods at all offices of the F. W. Dodge Corporation. This firm, with branch offices in all principal Southern cities, serves as a clearing house on major construction information.

Dodge offices file copies of plans and specifications for thousands of major construction jobs. Firms in the industry interested in finding out which construction jobs are open for bids can get late information from a Dodge Plan Room. Complete specification lists can now be given to interested parties at the rate of one minute per page. Formerly, it was necessary for contractors to copy pertinent data manually from the spec sheets.

### Case 3 — Mobile, Ala.

In the full scale reproducing or altering of engineering drawings, the Alabama Dry Dock and Shipbuilding Company, of Mobile, has saved an estimated $3,000 per year in materials and $1,400 per year in labor costs by adopting modern

ABOVE—Senior Engineer J. L. Carroll of Alabama Drydocks studies the shop drawings and the tracing from which they were made.

CENTER—Shop drawings are used by the man who actually makes the repairs in ADDSCO's Machine Shops.

LOWER—Workmen view shop print prepared from autopositive intermediate.

photographic materials. Furthermore, a switch to direct positive techniques for the reproduction of drawings has substantially cut the time by which ships must "lay up" for repairs.

When a ship comes in for repairs, ADDSCO's Production Department may require copies of prints that are on the ship and generally not available until its arrival. Up to a dozen prints of these drawings may be required for the estimators, the shops, and the men who will work on the ship.

In the past, it was first necessary to make a contact negative of each of them in the darkroom. The negative was developed, fixed and dried. Then a tracing or translucent drawing was printed from it. This process took about an hour and a half for a single drawing. If tracings of seven or eight drawings were made, it was often an all-day process. From these tracings, shop prints were produced on blueprint machines.

Now, however, the firm turns out top quality tracings in about one-sixth the time it formerly took. This is made possible by printing a shop's drawing directly onto translucent autopositive paper. This produces a positive tracing, from which shop prints are made in the usual way.

"A set of reproduced tracings that used to take all day to make can now be turned out in less than two hours," says ADDSCO Senior Engineer J. L. Carroll. "Thus, we get to work on the ship just that much sooner."

The same system, of course, works as well in reproducing drawings for use in production departments of metalworking or electronic plants. Particularly, it is typical in defense subcontracts that the prime contractor supplies a set of blueprints when a contract is let. The subcontractor, obviously, must create a master for making his own shop prints. This can be done in a matter of minutes with direct positive materials. Furthermore, autopositive materials can be exposed on most conventional reproduction machines. This makes it possible for a firm to go into a fairly comprehensive photomechanical program with a very minimum of investment.

### Case 4 — Wiring Plans

A good case in point is a firm which handles a number of contracts which call for special wiring of aircraft controls. Invariably, these contracts call for considerable development work and comparatively short production runs. Once a prototype is approved, it is necessary to train assembly line workers and get the item into production as quickly as possible.

Invariably, there are so many changes in the prototype that the original drawings have to be redone almost completely. This firm simply makes a conventional, continuous tone photograph of the finished prototype. This, then, is blown up to the desired size and reproduced on an autopositive drawing master. A draftsman completes his drawing merely by tracing over and highlighting the photograph. Overall preparation time is down to 25 per cent of what it used to be.

### Case 5 — Tulsa, Okla.

Another bet which industrial management of growing companies cannot afford to overlook today is the potential use of radiography in non-destructive testing.

A good example of how a radiographic inspection program can pay off is seen in the case of Creamer and Dunlap, Inc., of Tulsa, Oklahoma. This firm fabricates welded tanks. Its specialty is a tank used in the bulk storage of liquid petroleum gas. Undertaking a program for full x-ray inspection of all welded seams saves Creamer and Dunlap an estimated $400 on each unit produced.

By using x-ray inspection techniques, this company is permitted to reduce the gauge of its welds to a point where a finished tank weighs 7,000 pounds less, resulting in a $400 saving per tank in materials, fabrication, and shipping costs.

*(Continued on Page 66)*

The advantage of making copies on translucent paper — as shown here — is that the draftsman can build-up drawings directly on the original copy and then reproduce directly from it on the Verifax Copier. This saves the time and cost of either re-drawing the entire copy by hand or sending it out for photographic copying (negative and positive) preparatory to making additional copies.

# You get these benefits when you install YARWAY GUN-PAKT EXPANSION JOINTS

Why do industrial plants, institutions, universities and central heating plants SPECIFY and INSTALL Yarway Gun-Pakt Expansion Joints?

Because with Yarway you get:

- **CONTINUOUS SERVICE**
  Costly shutdowns are eliminated. Packing is seldom necessary but may be added *under full line pressure*. No vents are necessary. Never needs repacking.
- **RUGGED DEPENDABILITY ALL STEEL CONSTRUCTION**
  Durable chromium plated seamless steel sleeves. No chance *of metal fatigue*. Wrought steel bases provide rugged, positive anchorage.
- **INTERNAL AND EXTERNAL GUIDES**
  Positive alignment of sleeve in stuffing box *—where it counts!*
- **LIGHT WEIGHT, STREAMLINED DESIGN**
  Requires less space to install—less space to maintain—smaller manholes.

Many Gun-Pakt joints have been *in service over 25 years with only nominal maintenance*—no major repairs or periodic overhauls. Maintenance costs are negligible—records show average to be one manhour and 65 cents worth of packing per joint per year. AND—NEVER A SHUTDOWN FOR REPACKING!

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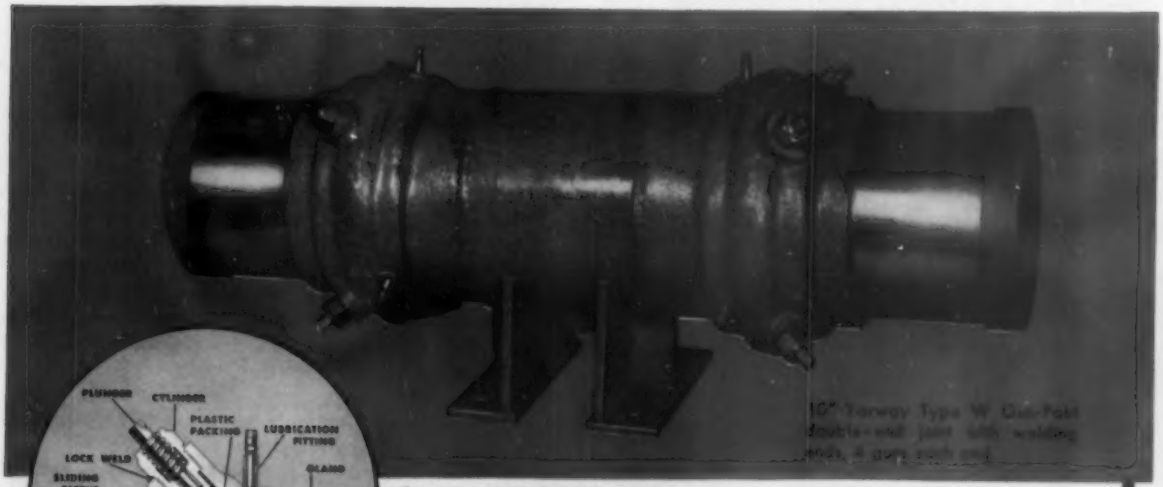
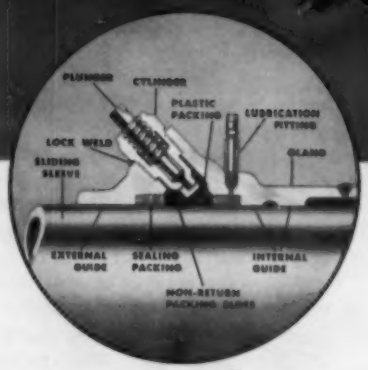





Cross-section of Gun-Pakt feature. To add packing, just insert a plug and turn the plunger. Note non-return packing slots.

YARWAY GUN-PAKT

# Centrifugal Pump Clinic

**QUESTIONS & ANSWERS** — Conducted for SPI readers by **Igor J. Karassik**, consulting engineer and manager of planning of the Harrison Division, Worthington Corporation.

## Saving Boiler Feed Pump Stuffing Box Leakage

### *Question . . .*

**TREATED MAKE-UP** water for the boiler feedwater system in our high pressure plant is a fairly expensive item. Exact cost is hard to figure, but we estimate that it costs us somewhere near 60 cents per thousand gallons — not counting any capital charge on treating equipment.

We know right accurately that we are wasting approximately 1,200,000 gallons of this water each year through the packing glands of our boiler feed pumps that represents roughly $720.00 per year down the drain.

Is there any practical, economical way to eliminate, or greatly reduce this loss?

### *Answer . . .*

**A CONSIDERABLE** amount of attention has been devoted within the recent years to the problem of boiler feed pump stuffing boxes. This attention has culminated in the development of two alternate solutions to the problem, each intended to eliminate the stuffing box entirely.

One of these solutions is the use of mechanical seals, and the second is based on the replacement of the packed box by a labyrinth bushing and the use of condensate injection.

In this latter construction, cold condensate is brought directly from the discharge of the condensate pump into a central point of the labyrinth. A portion of the injection flow enters the pump interior and the remainder leaks out into a collecting chamber and returns to the condenser hotwell.

Each of these two solutions has its adherents and I do not intend to examine their relative merits here. It must be noted, however, that conditions exist where a conventional packed stuffing box cannot be used and one of these two solutions must be incorporated.

On the other hand, there are other conditions of service where the packed stuffing box can operate very satisfactorily and where the major objections to its use center on the loss of the stuffing box leakage and on the need of more maintenance than with condensate injection.

As a matter of fact, leakage is the objection frequently brought out. Many installations have been operating in the field for a number of years with maintenance too insignificant to justify a change.

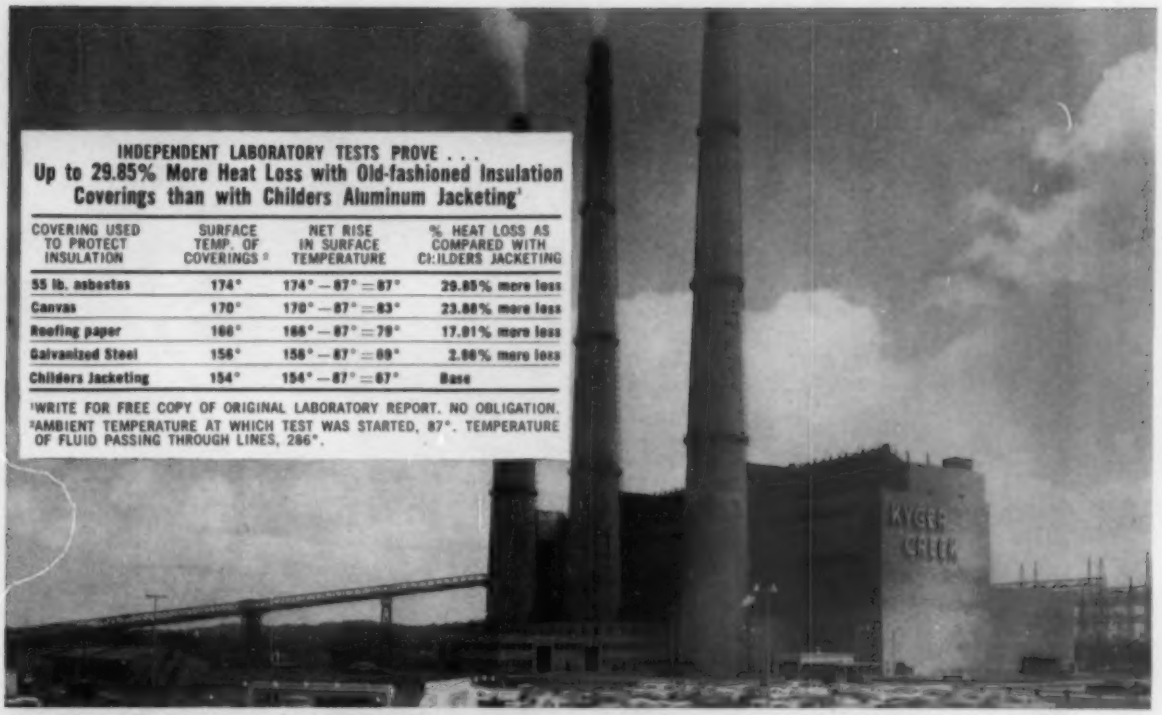
On the other hand, however, the loss attributable to stuffing box leakage is quite appreciable and some effort would be justified to reduce or eliminate it almost entirely. But attempts to reduce these losses by tightening up on the glands are generally followed by disastrous effects on the life of the packing and of the shaft sleeves. All packed stuffing boxes must have adequate leakage to lubricate the packing and carry away some of the heat of friction.

Generally, this leakage drops into the bearing bracket and drains to waste. Attempts to reclaim it are not very successful, because it is frequently contaminated by oil.

Since all the feedwater is treated, the stuffing box is charged with the full cost of treated water. In addition, since the leakage represents a very important portion of total make-up, it might even be reasonable to charge against this leakage a portion of the initial cost of the water treating installation.

But let us make an estimate of the costs omitting all capital charges. Let us assume that each stuffing box leaks 2 quarts per minute. A boiler feed pump, therefore, will leak one gallon per minute or 1440 gallons per day, and 525,600 gallons per year. This loss takes place whether the pump is running or not because an idle pump kept on standby duty is maintained warmed up, with suction and discharge valves open, ready to be put on the line at a moment's notice.

The actual cost of treated water varies in different steam power stations. In one case, I have had it reported that water is charged at $1.50 per 1000 cubic feet of raw make-up water, plus another $1.50 for the necessary chemicals to treat the water, bringing the cost to $0.47 total per 1000 gallons. Another power plant charges as

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| COVERING USED TO PROTECT INSULATION | SURFACE TEMP. OF COVERINGS[2] | NET RISE IN SURFACE TEMPERATURE | % HEAT LOSS AS COMPARED WITH CHILDERS JACKETING |
|---|---|---|---|
| 85 lb. asbestos | 174° | 174° — 87° = 87° | 29.85% more loss |
| Canvas | 170° | 170° — 87° = 83° | 23.88% more loss |
| Roofing paper | 166° | 166° — 87° = 79° | 17.91% more loss |
| Galvanized Steel | 156° | 156° — 87° = 69° | 2.98% more loss |
| Childers Jacketing | 154° | 154° — 87° = 67° | Base |

[1]WRITE FOR FREE COPY OF ORIGINAL LABORATORY REPORT. NO OBLIGATION.
[2]AMBIENT TEMPERATURE AT WHICH TEST WAS STARTED, 87°. TEMPERATURE OF FLUID PASSING THROUGH LINES, 286°.

**More than 500,000 square feet** of maintenance-free Childers Aluminum Jacketing protect the insulated lines in this modern Kyger Creek Plant of the Ohio Valley Electric Corporation which was rated first in overall thermal efficiency in recent annual ratings of major power plants by the Federal Power Commission.

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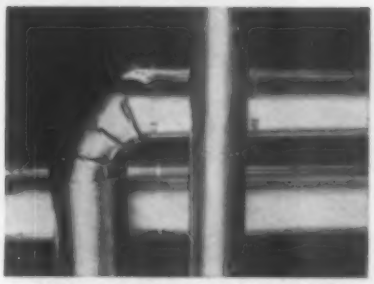

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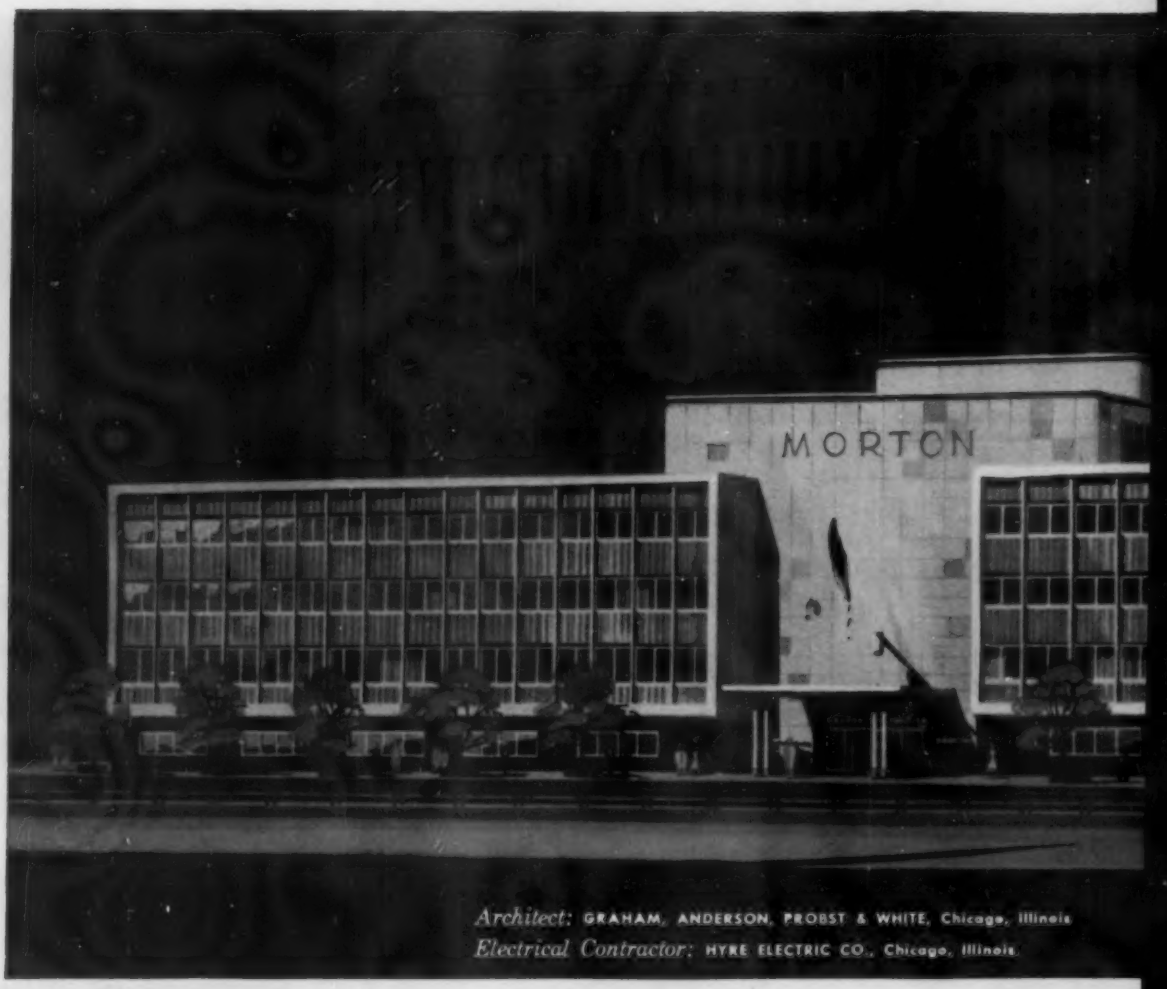


*Architect:* GRAHAM, ANDERSON, PROBST & WHITE, Chicago, Illinois
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The beautiful, new Morton Salt Building is located at 110 North Wacker Drive in Chicago — just outside the Loop.

The safest and most dependable electrical protection was needed because the engineers estimated the available fault current might easily reach a value of 75,000 amperes.

For this reason, the main switchgear, consisting of 1-4000 ampere, 1-2000 ampere and 1-1200 ampere pressure switch, is completely equipped with BUSS Hi-Cap fuses.

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With rare exceptions, other types of protective devices protect only against short-circuits —

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*For the FUSETRON fuse story ask for Bulletin FIS.*

*For Loads above 600 amperes . . .*

**BUSS Hi-Cap Fuses offer Safest, Most Modern Protection**

They have an interrupting capacity sufficient to handle any fault current regardless of system growth — and by coordinating them with FUSETRON fuses on feeder and branch circuits, outages caused by fault currents can be limited to circuit of origin.

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359

**BUSSMANN MFG. DIV. McGRAW-EDISON CO. ST. LOUIS 7, MO.**

much as $1.15 per 1000 gallons. Thus, in the case we have examined, the cost of the stuffing box leakage may run from $250 to $600 per year, per pump.

An installation of three boiler feed pumps serving one main unit can sustain a loss of $750 to $1,800 per year merely by allowing the stuffing box leakage to go to waste. No wonder that serious consideration is justified for any sound procedure to reduce this loss.

The most logical and the most promising approach, short of replacing the stuffing boxes by mechanical seals or by condensate injection, is to prevent all possible contamination of the leakage so that it may be reclaimed easily and safely and returned to the cycle. In other words, the leakage must be collected *before* it issues into the bearing bracket and becomes mixed with oil leakage from the bearings.

A test was arranged in the field on a high pressure boiler feed pump in order to determine whether such an approach was practical and whether it would be effective. The pump was fitted with a special gland and a special shaft sleeve nut, as shown in the drawing. The nut was provided with grooves to guide the leakage into a drain in the bottom half of the gland. This drain was tapped and connected to a flexible hose, which in turn was piped to a drain return tank. Previously the shaft sleeve nut was smooth and the leakage dripped into the bearing bracket and was piped away to waste through drain opening "B."

Prior to the test, the pump was repacked with the combination of packing indicated on the drawing, the packing was run-in and adjusted so that the stuffing box leakage was essentially equivalent to the normal flow. The operating conditions of the pump were as follows:

| | |
|---|---|
| Pump capacity | 420,000 lbs/hr |
| Discharge pressure | 1800 psig |
| Suction pressure | 140 psig |
| Pumping temperature | 262 F |
| Pump speed | 3550 rpm |
| Cooling water inlet temperature | 96 F |
| Cooling water outlet temperature | 107 F |
| Cooling water flow | 4 gpm |

The test was carried on for a sufficient length of time to obtain very accurate measurements of the leakage amounts, which were found to be the following:

| | |
|---|---|
| Leakage at drain A | 0.55 gpm |
| Leakage at drain B | 0.003 gpm |
| Temperature of leakage | 198 F |

In other words, this arrangement reclaimed all but one-half of one per cent of the leakage. The test could certainly be considered successful.

A few refinements should be mentioned, which would improve the arrangement used for the test. In the first place, a better connection should be used at the point where the flexible hose is attached to the gland drain, because it is

(*Continued on Page 60*)

Fig. 1. The pump was fitted with a special gland and special shaft sleeve nut as shown.

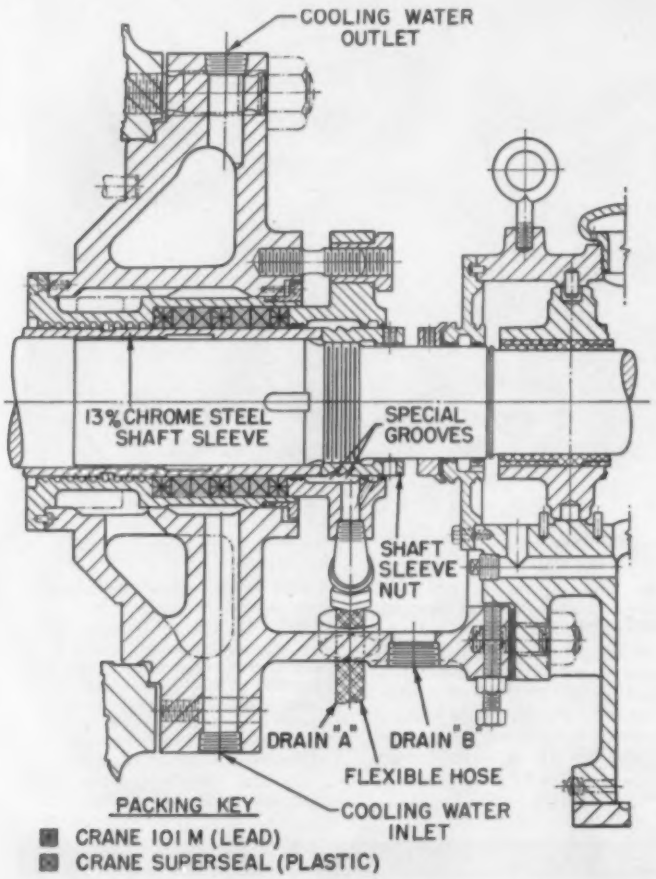
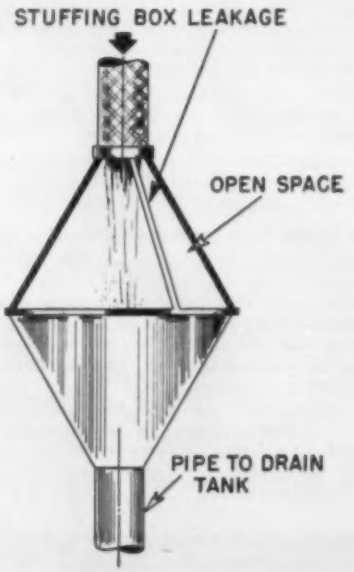
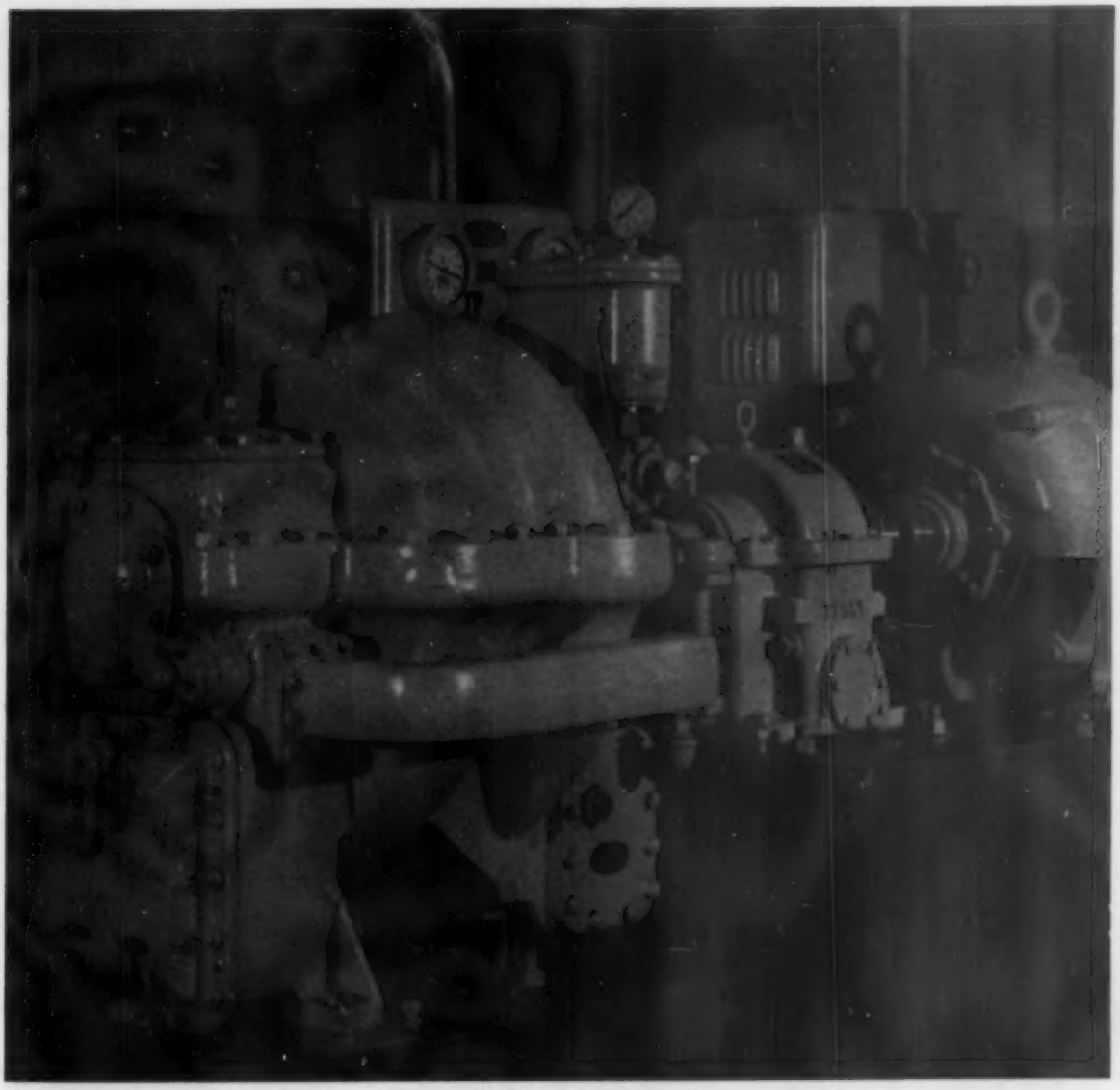



Fig. 2. Open telltale for stuffing box leakage.





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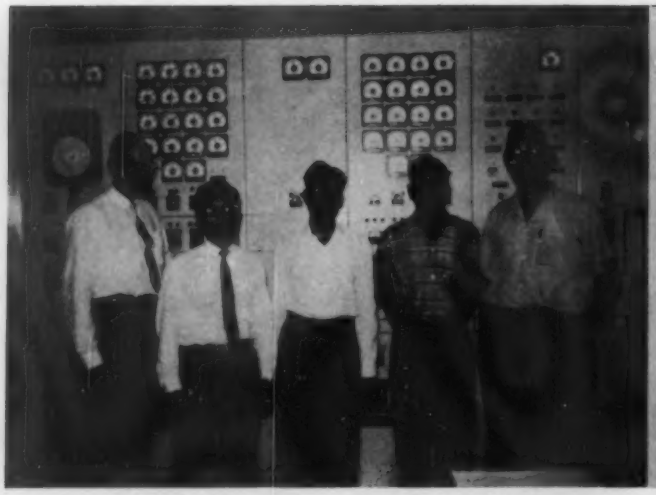


The author (left), and J. J. McGinnis (right), flank K. S. Kim, Seoul, Korea and Messers Abdul Kahn and Abdul Waheed, technical instructors from Pakistan.

M. G. Louthan shows control room to Ryang Kun Park, Electrical Engineer of Tanginri Power Plant, Seoul, Korea.

# Internationalism in Industry

## We Learn While We Teach

By T. H. GEORGE
Mechanical Engineer, Generating Dept.
Oklahoma Gas and Electric Company

"MR. KIM, here is a feature we have found very helpful in allocating generation to our various units."

"Mr. Wong, this is a refinement you may wish to install in your power plant."

Think you're in China, or Korea, or perhaps Formosa? Not at all! You are just listening in on a conversation in a power plant in the Great Southwest, or perhaps the Southeast, or any other part of the United States for that matter, because teams of public utility engineers from foreign countries have been visiting electrical utilities here in the United States for the past several years. The object? To take back to their countries some of the American know-how in the efficient operation of privately owned electrical utilities.

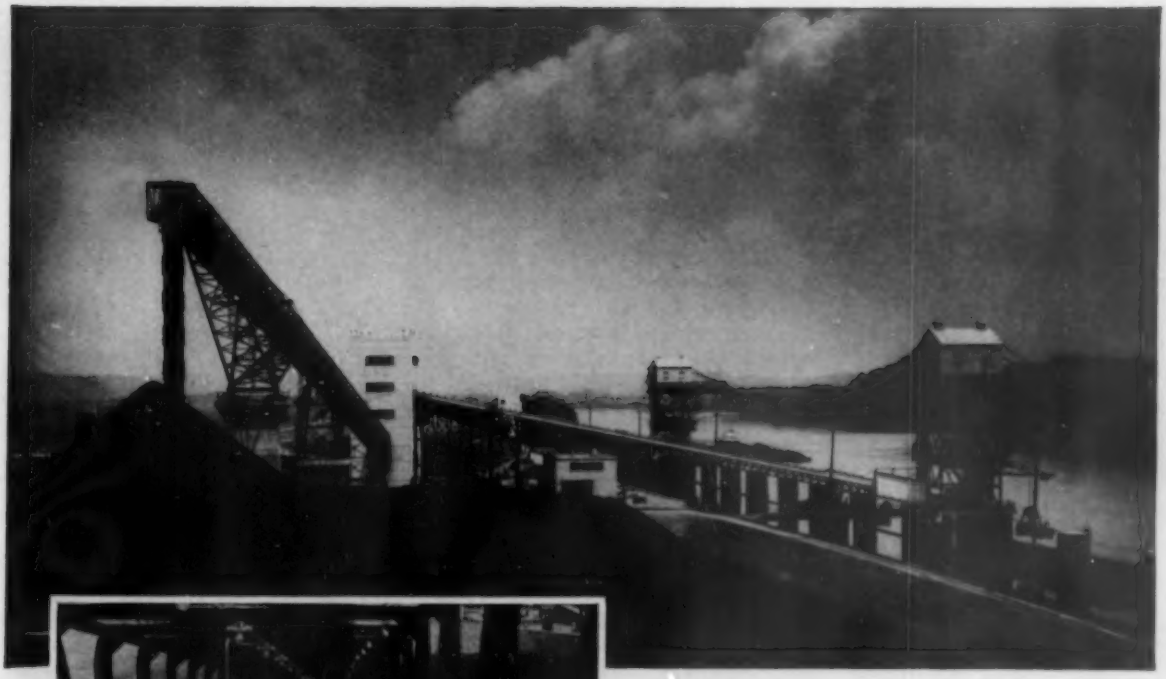
### Meet Mr. Soo

Just so we will know the type of man we are talking about let's take a look at a typical visiting engineer from South Korea.

Mr. Kwon Soo is thirty-nine years old, married, and has two small children. He attended schools in Japan and received a B.S. degree in electrical engineering from a university in Seoul. He worked with our army engineers during the Korean War. Since 1953 he has been an electrical engineer with a Korean electrical utility. He speaks English fluently and admits to a speaking acquaintance with German and Japanese. He has read widely and can and will discuss any aspects of the world situation. He is in this country under the auspices of the International Cooperation Administration.

Now that you have met our foreign guest, let's see what he does during his stay. A typical two weeks' visit may include the following:

1. An orientation visit with representatives from the Personnel Department who give him the history, background, aims and objectives of the company.
2. A visit with the department head whose department will be his host, and who describes the over-all operation of his department.
3. Working directly with the supervisors of the various sections of the department. These sessions are most fruitful for here methods are explained and ideas exchanged. It is here, too, that the visitor may request diagrams, equipment drawings, operating procedures, etc.



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4. Periodic sessions and final interview with Personnel Representative to check the progress of the visit, see if any changes in schedule are desirable, etc.

The next question might reasonably be, "What do the operating companies think of the idea?

Judging from the hospitality accorded the visitors, they think it is a good one. At least they're putting their best foot forward. This is evident from the beginning of each visit. Only top men in each section are assigned to work with the visitors and they give freely of their time as well as of their knowledge.

Special demonstrations are planned, if necessary. For example, an idle gas turbine was recently started up to demonstrate its short start-up time. Incidentally, gas turbines are a novelty to most visitors — domestic or foreign.

Special trips to points of interest are planned. These may be purely technical trips such as to a large commercial maintenance shop or a university laboratory; or they may be to some natural phenomenon or famous historical landmark. And probably the most appreciated thing is that these visitors are often entertained in the homes of their company hosts.

One thing that all these visitors have in common, whether from Europe or Asia, is that they are all avid camera bugs. And, most Americans note with a tinge of envy, their cameras are the very best. Picture taking isn't reserved entirely for technical subjects. Churches, homes, gardens, public buildings and all aspects of Americana come in for their share. The writer once stopped his car out in a rural area so an eminent Doctor of Science from Germany could photograph a rural mailbox.

### Careful Please!

Perhaps of all the pitfalls that an American guide should avoid, the greatest is the tendency to drift into speaking "Pidgin English." This is especially easy to do, particularly if the foreign visitor has difficulty in speaking our language. It is only natural to talk back to the foreigner in the same type English he is using. The catch, however, is that while the visitor may have trouble speaking English, he may understand it quite well.

So the guide is generally making himself look ridiculous when he resorts to such phrases as "Me work this company long time," or "Your country big cold, winter time?" It looks even more ridiculous if he accompanies this broken English with some stupid gestures.

We may safely assume the visitor profits from his association with our engineering and management people. What do we Americans gain from the association?

### We Grow a Little

First, most of us gain a new appreciation of foreigners. Many of us have assumed a superiority over foreigners that simply does not exist. True, our country is well advanced in technology and Americans have by far the highest standard of living in the world. But, it comes as a shock to many of us to learn that the little Korean engineer has a concept of the physical sciences equal to, if not better than, ours; that he speaks three or more languages fluently; and that he daily solves engineering problems that should tax the best minds in our country.

Another bonus we get is a reappraisal of ourselves and our ways of doing things. There is nothing so educational as trying to explain our operations, methods, or procedures to a person whose usage of English is limited. It makes us get down to fundamentals. And sometimes when we get down to fundamentals, we find improvements possible. The procedure practically forces us to make a searching inventory of the whys and wherefores of our operations.

And lastly, we gain by laying the groundwork for international friendship. Some philosopher has said that when you really get to know a person you will like him. A close association of several weeks goes a long way toward getting the participants acquainted. And with few exceptions this has promoted a mutual appreciation and even affection. One crusty old power plant operator who had sat in on a few sessions with an oriental visitor put it this way: "Now that I know how smart those fellers are, if we ever get in a scrap I want 'em on our side."

## Pump Clinic

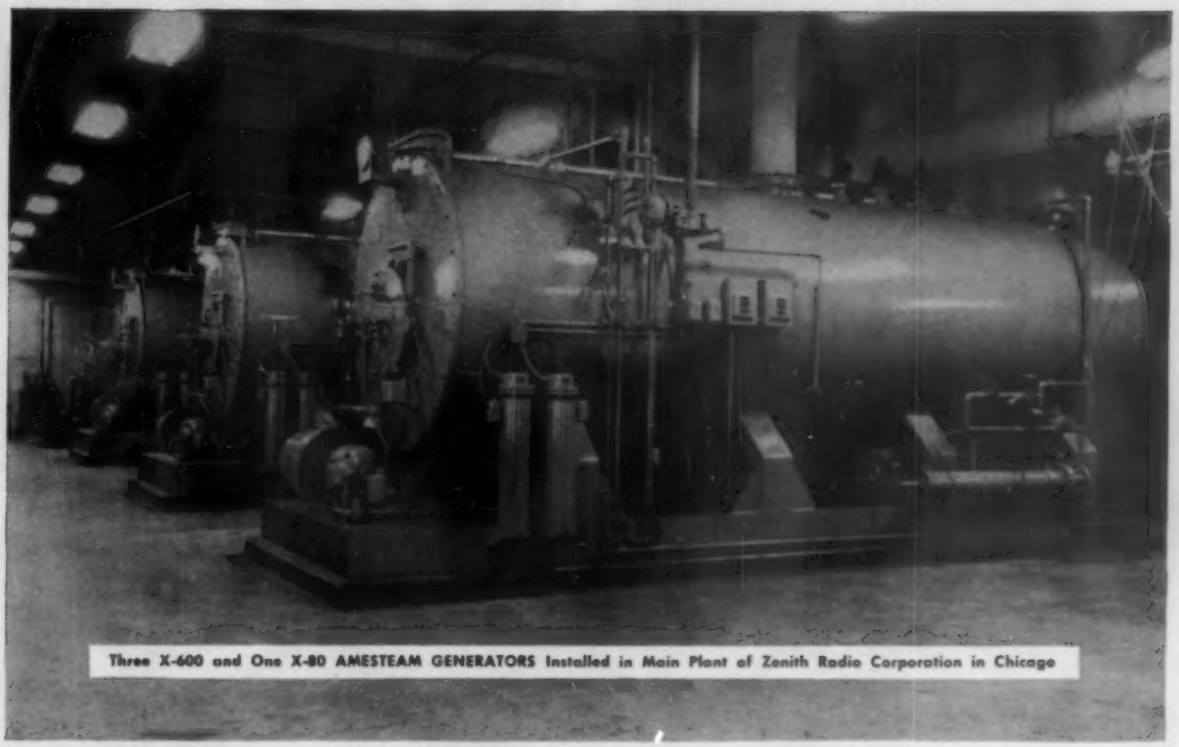
(*Continued from Page* 54)

very difficult to use a wrench in the cramped position down in the bearing bracket cavity to tighten or loosen this connection if the gland is to be removed when repacking the stuffing box. Since the pressure in the hose is just nominal, the connection need not be more than hand tight so that a regular air hose coupling would be satisfactory.

In addition, a provision must be made which would permit the operator to observe the amount of stuffing box leakage at all times. Otherwise, there would be the danger that the gland would be tightened excessively, with resultant damage to packing and to shaft sleeve. An open telltale can be installed, as shown on the drawing, so that the flow would be subject to inspection.

If a water-quenched gland is used, the same arrangement can be used except that the dimensions of the drain opening in the gland and the size of the flexible hose must be adequate to carry away both the leakage through the stuffing box and the quenching flow. Of course, if raw water is used for quenching, the leakage is contaminated and must be disposed of in the same manner as the quenching water was handled prior to this modification to the stuffing box. But since the water no longer is contaminated by oil drips, it can certainly be reclaimed and returned to raw water storage.

A word of caution, in connection with the use of water-quenched glands. The supply of quenching water should be stopped once in a while and the leakage quantity should be observed at the open telltale. Otherwise, the operator will be unable to distinguish between the leakage and the quenching water and the gland may be tightened excessively.



Three X-600 and One X-80 AMESTEAM GENERATORS Installed in Main Plant of Zenith Radio Corporation in Chicago

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## Metals Conference — Augusta, Ga.

The Savannah River Chapter of the **American Society for Metals** will be host to the ASM Southern Metals Conference in Augusta, Georgia, on May 4, 5, and 6.

Theme of the Conference will be "Metallurgical Frontiers." The Southern Metals Conference is dedicated to promoting a better understanding of the effects of metallurgy and metal working on the scientific and industrial life of the region.

The program will feature many advances in the understanding and use of metals in recent technology, including a discussion of advanced concepts in solid fuel power reactors by Walter H. Zinn, nuclear reactor designer, and a review of materials research for outer space ventures by D. W. Gates, missile materials scientist from the Army Ordnance Missile Command, Redstone Arsenal, Ala. An appraisal of mineral resources for the future will be presented by Royce Hardy, U. S. Assistant Secretary of Interior.

Among other highlights of the Conference will be an address by National ASM President, Clarence H. Lorig and a tour of the Atomic Energy Commission's Savannah River Plant.

## ASME Quarterlies

The first issue of *Journal of Engineering for Power*, one of a series of new quarterly publications initiated by The American Society of Mechanical Engineers, is available. Other quarterlies to be issued by the Society during the year under the general heading, Transactions of the ASME, will be *Journal of Engineering for Industry, Journal of Basic Engineering, Journal of Heat Transfer* and the long-established *Journal of Applied Mechanics.*

An announcement by the Society said that the new series represents a revision of the procedure under which fundamental engineering information had been published. Topics of related interest will now be grouped under a single cover so that it will be possible for engineers to subscribe only to those issues of direct interest to them. In addition, publication of five quarterlies, a total of twenty issues a year, will permit inclusion of more information than was possible in the previous format.

# ATOMIC DEVELOPMENTS

By JOHN F. LEE
SPI Consultant on Atomics
Broughton Professor and
Head of Mechanical Engineering Dept.
North Carolina State College

**A BREAKTHROUGH** in the "thermal barrier" of insulation materials has been achieved by a new machinable insulation material, Supramica 620 ceramoplastic, which will operate at temperatures up to 1550 F with complete dimensional stability.

Such temperature resistance is over 60 per cent higher than that achieved by any previous ceramoplastic material, and it puts Supramica 620 within the same broad temperature range as ceramic materials such as alumina and steatite which are relatively difficult to machine, and which were hitherto the only material available for such high temperatures.

Its fine and uniform texture enables Supramica 620 ceramoplastic to be machined to most exacting tolerances, even to one ten-thousandth of an inch. And yet its characteristics, including its temperature resistance, enable it to hold complete dimensional stability under most adverse conditions of thermal cycling, humidity and moisture (from water, oil and organic solvents).

Other characteristics are: high dielectric strength—250 volts/mil. (ASTM test procedure D-149.); excellent arc resistance — 300 seconds. (ASTM test procedure — D-495.); will *not* carbonize; negligible electrical loss — 0.011 loss factor, $10^6$ CPS (ASTM procedure test procedure — D-150.); resistance to nuclear radiation; thermal expansion coefficient equal to that of stainless steel enabling matched seals using appropriate solder glasses.

Supramica 620 is manufactured by Myculex Corporation of America.

### Nuclear Fuel Costs

Nuclear fuel costs for the initial operation of four large-scale nuclear power plants to be completed in the early 1960's will probably be less than half the first-core fuel cost of the plant at Shippingport, Pa., which went into operation late in 1957 as the world's first full-scale atomic power plant devoted exclusively to peacetime uses. This was indicated in a new Edison Electric Institute report, "Survey of Initial Fuel Costs of Large U. S. Nuclear Power Stations."

The marked reduction in estimated fuel costs, according to the report, for stations now being built as compared with the Shippingport Plant is evidence of the speed with which technical progress is being made in this field. Further, these advances indicate that the gap between fossil and nuclear fuel costs is being significantly narrowed.

### Carolinas-Virginia

The Atomic Energy Commission has announced that the signing of a contract with Carolinas-Virginia Nuclear Power Associates for a demonstration nuclear power plant at Parr Shoals, South Carolina, 25 miles northwest of Columbia, South Carolina. The Carolinas-Virginia Nuclear Power Associates (CVNPA) include Duke Power Company, Charlotte, North Carolina; South Carolina Electric & Gas Company, Columbia, South Carolina; Carolina Power and Light Company, Raleigh, North Carolina; and Virginia Electric and Power Company, Richmond, Virginia.

The contract with CVNPA covers the design, development, fabrication, construction and test operation of a heavy water-moderated pressure tube-type reactor fueled with slightly enriched uranium.

The plant will produce steam for use in an adjoining conventional power station. The net electrical capacity is expected to be 17,000 kilowatts. CVNPA, under the contract, will pay the capital costs, which they estimate to be approximately $22,000,000. Maximum cost to the Commission will be $15,075,000. This includes the cost of research and development programs and the value of use charges for fuel and heavy water which will be waived for the first five years of plant operation. It is expected that the reactor will be put in operation by June 30, 1962.

CVNPA has engaged Stone & Webster Engineering Corporation to be the architect-engineer and Westinghouse Electric Corporation to develop and furnish plant equipment. CVNPA submitted its proposal for the project last year under the Commission's Power Demonstration Reactor Program.

This program is designed to bring the resources of industry into the development of engineering and economic information on the performance of nuclear power

(*Continued on Page 66*)

reactors and to advance the time when nuclear power becomes economically competitive.

### Nuclear Power Device

The Atomic Energy Commission reported to the President the development of a five-pound device four-and-three-quarters inches in diameter and five-and-a-half inches high which is capable of converting into five watts of electricity the radiation emitted by one-third of a gram of radioactive material.

The device, called SNAP III, takes its name from the Commission program under which it was developed — the Systems for Nuclear Auxiliary Power program of the Aircraft Reactors Group. The objective of this program is the development of sources of auxiliary electric power for space missiles systems.

SNAP III is a "proof of principle" device, developed in a practical size and with a practical power rating. It derives its energy from radioactive polonium - 210. The radiation of the polonium is converted directly into electricity by means of thermoelectric materials (thermocouples).

There are no moving parts in the device. With a fresh quantity of radioactivity (3000 curies) SNAP III will generate electricity at the rated capacity of 5 watts at an efficiency of 8 to 10 per cent. This efficiency is far greater than that of any other known thermocouple device developed to date.

In a test of performance characteristics of the device after the first 140-day half-life of the polonium source, an operating model of SNAP III which has been delivered to the Commission produces electricity at the rate of 3 watts, at an efficiency of between 5 and 6 per cent.

It is estimated that in the course of 280 days (two half-lives of the polonium source) SNAP III could produce a quantity of electricity equal to the output of 1450 pounds of the best conventional batteries available.

Development of SNAP III is regarded as a highly significant achievement. In addition to its lightweight and its relatively long operating capability which particularly suit it to space applications it has possible peaceful applications wherever small sources of electricity are needed.

For example, the device could replace conventional batteries in various air and sea navigation aids or on communications lines, thus providing power for much longer periods than batteries now can and minimizing the cost of maintenance of the power source and of logistic supply.

SNAP III has the additional advantage that its efficiency is not adversely affected by extreme climatic conditions. Unlike the conventional battery which decreases in efficiency as temperatures go down, SNAP III will increase in efficiency with temperature drops.

### Radioisotopes

The Atomic Energy Commission has announced that the amount of radioisotopes shipped from the Atomic Energy Commission's Oak Ridge National Laboratory for use in the peaceful applications of nuclear energy increased 37 per cent during 1958. The amount shipped in 1958 also represents 37 per cent of the total radioisotopes shipped from the laboratory during the 12 years that the program has been underway. During the first month of 1959, the laboratory made 1,099 shipments totalling 16,086 curies.

A total of 228,717 curies of radioisotopes were shipped during 1958, compared to 166,652 curies during 1957. A total of 614,565 curies have been shipped from the laboratory since the radioisotopes program was started with the first shipment August 2, 1946.

While the total quantity of radioactivity units shipped increased sharply, the number of shipments for 1958 showed only a slight increase from 1957. This resulted largely from the increased size of individual shipments to private firms which were making further distribution to ultimate users and from larger individual shipments of cobalt 60, cesium 137, iodine 131 and phosphorus 32.

Sales returns decreased from $2,599,284 in 1957 to $2,438,169 in 1958, reflecting a reduction in prices for cobalt 60 effective August 1, 1957. The laboratory made 1,061 shipments containing 5,893 curies in December, making a total of 14,131 shipments for the calendar year.

The Atomic Energy Commission has amended its byproduct material (radioisotopes) regulation to simplify licensing procedures relating to sealed devices containing radioisotopes. The amendment provides a means of placing a number of measuring and gauging devices and devices for producing light and ionizing air under "general license"; that is, the amendment authorizes possession and use of the radioactive material when contained in the devices without requiring that the user obtain a specific license from the Commission. The general licensing provision applies, however, only to those devices which are manufactured, tested and labeled as required by the Commission in a specific license issued to the distributor of the devices.

Devices of the sort affected are being used increasingly by industry in research and to insure quality control in the production, preparation or packaging of materials for distribution to industry and the public. They are constructed with built-in protective features and may be safely used by untrained persons provided the devices are properly labeled, used only for the intended purpose, and regularly serviced and repaired.

## Photography

(*Continued from Page* 48)

### Case 6 — Houston, Tex.

In many cases in modern industry, improved engineering techniques utilizing photography have a direct bearing in increasing a company's sales. The Hughes Tool Company, of Houston, for example, is able to render improved service in designing and fabricating bits for oil well drills by using high-speed movies.

Where a customer has a particular drilling problem, arrangements are made to ship a sample of the rock through which he is boring to Houston. Studies are made with high-speed motion pic-

(*Continued on Page* 85)

# One good turn deserves 192 others!

Pipe fabricators: Cornell & Underhill, Inc., Hoboken, N. J.

**During fabrication,** the USS* NATIONAL Seamless Steel Tubes used in this 8-ton heat exchanger were turned, or bent, 193 times! What's more, fabrication involved 584 pipe welds of various types and 1,720 inches of fillet welding. Mainly, the 35-foot-long, 5-foot-high bundle consists of ¾-inch Schedule 80 NATIONAL* Seamless Pressure Tubes; fabricated for the Solvay Process Division of Allied Chemical & Dye Corporation.

NATIONAL Seamless Pipe and Tubes are known the world over for safety and dependability. They are available in carbon through the various alloy and stainless grades. Get the complete story by sending for Bulletins 10 and 26. And, for technical assistance, our Mill Service Force is available for field consultation. Write to National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

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*"The world's largest and most experienced manufacturer of tubular products"*

**National Tube Division of USS United States Steel**

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors · United States Steel Supply Division
United States Steel Export Company, New York

*Atlanta Electrical Engineer Gives Some Pointers*

# Things To Look For

**AN 18 TON** ammonia refrigerating compressor was driven by a 35 hp, 3 phase, 60 cycle, 220 volt motor, wound rotor type. The compressor was one of a group of five in an ice making and refrigerating plant.

While checking the load on the several motors in this plant, it was discovered that the 35 hp motor was operating single phase. The question raised following this discovery was, what made it possible for this motor to be started on a single phase supply?

However the fact remained that it was being started without difficulty, and after starting, it would operate as a single phase unit.

An investigation disclosed that there was a loose connection of one of the wires within the casing or frame of the resistance type starter. This allowed the motor to start as a 3 phase unit, but as soon as the controller handle was swung into its final position against the post, one leg of the 3 phase circuit was killed and the motor then operated as a single phase unit. Had the trouble not been discovered, the chances are that even though the compressor to which the motor was connected was more or less a stand-by unit, the overheating resulting from single phase operation would in time have damaged the insulation of both stator and rotor.

The motor was one of early vintage and was not provided with thermal cutouts to protect against overheating from overloads and single phase operation.

The above case history illustrates the value of periodic check ups of electrical and mechanical equipment.

### Fit Motor to Job

Some plant managers and their engineers pride themselves on the fact that they have plenty of horsepower driving their equipment. If the manufacturer tells them that the machine they want to purchase requires a 5 hp motor, inevitably they will insist on the next largest size, the 7½ hp.

This practice is expensive in several ways. Naturally, the first cost is higher and the buyer defeats his own purpose because the motor efficiency is lower, and finally, the power factor is decreased and there is an increase in current in-put each time the motor is started from rest.

A 10 hp motor drove a centrifugal pump. Checking with the manufacturer, it developed that the pump required only a 3 hp motor to carry it through its entire range of operating characteristics. This pump was controlled by a pressure-stat and it started and stopped on an average of five times per day. Not only was the running efficiency materially reduced, but each time the motor started, an unnecessary surge was thrown on the supply circuit.

### Voltage Checks Important

Not long ago the writer investigated a case of high power cost in an industrial plant. There were a number of motors in this plant and all operated around the clock. They ranged from 5 hp to 100 hp.

For the most part, low motor efficiency of oversize motors was causing the high power costs. But the size wire used on motor circuits was also too small to carry the load without excessive voltage drop.

A 10 hp motor drove a multistage air compressor through a v-belt. The compressor assembly was approximately 350 feet from the distribution panel in the main building.

The motor was 3 phase, 60 cycle, 220 volts. The potential supplied by the utility was found to be 225 volts, yet the voltage actually delivered to the motor was found to be slightly less than 200. The size of the wire used for running the circuit was found to be a No. 10 B & S gauge.

A new circuit of No. 4 B & S gauge wire was installed. This corrected the low voltage trouble.

Now the point is that for several years, this particular motor was operated at low voltage. While low voltage does not greatly cut motor efficiency, it does increase the amperes flowing and amperes cause heat loss in the power circuits.

*By E. L. HAWLEY*
*Electrical Engineer*
*Scripto, Inc., Atlanta, Ga.*

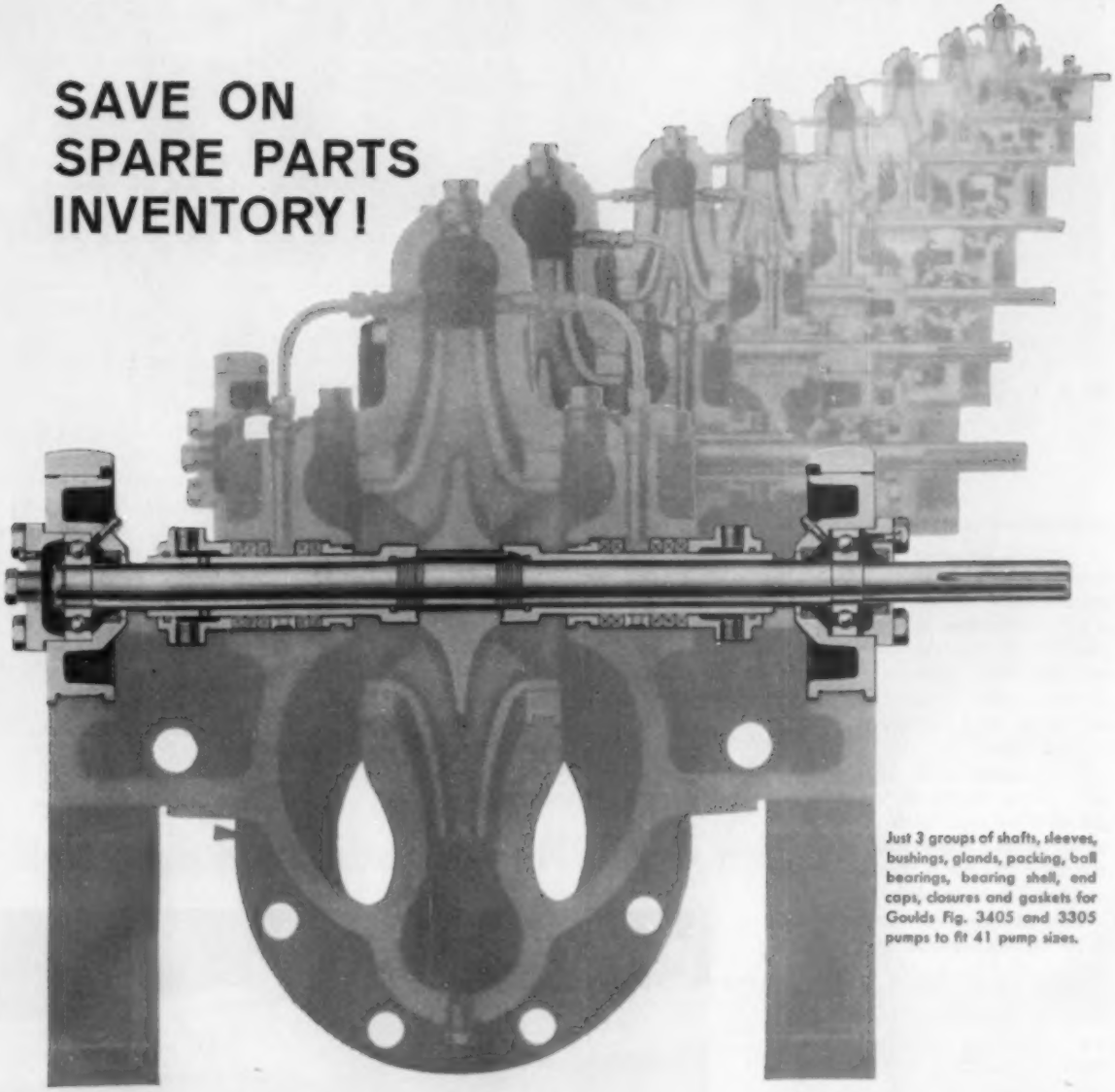
## Avoid Haphazard Selection

**"WHEN YOU SEND** a boy to mill, send a Big One" is an often heard expression among mechanics. By the expression they mean — don't build a weak structure or use a weak rope or cable, etc. Electrical engineers certainly agree that a factor of safety is desirable — and for static structures and many mechanical elements "too big won't hurt."

Motor selection, however, should be more exact. Rather than put in a motor "big enough for the future," it may well be better to change motors for a larger size at the right time.

Initial wiring installations on the other hand should be ample. Loads have a way of growing, and "too big" circuits won't harm operations. Replacing circuits with heavier conductor is an expensive procedure, and sometimes the cost of interrupting operation costs more than the electrical circuit job.

# SAVE ON SPARE PARTS INVENTORY!



Just 3 groups of shafts, sleeves, bushings, glands, packing, ball bearings, bearing shell, end caps, closures and gaskets for Goulds Fig. 3405 and 3305 pumps to fit 41 pump sizes.

## See how just 3 groups of parts fit 41 pump sizes!

High degree of interchangeability of parts on Goulds Fig. 3405 single-stage and Fig. 3305 two-stage Centrifugal Pumps helps you save four ways:

1. You cut down your spare parts inventory.
2. You can make changes in the field to meet new requirements.
3. Off-the-shelf delivery of standardized parts.
4. You can get lower initial cost, due to standardization of parts during manufacture.

Just three shaft and rotating parts assemblies provide for 41 sizes of these two popular pumps. You cut spare parts inventories *up to 91%*, save the cost of unnecessary overstocking.

Up to 82 pump combinations are possible—considering right- and left-hand rotation—and rotation can be changed in the field due to unique sleeve locking device (patented). Mounting dimensions and motor drive bedplates are standardized to facilitate changing without the additional expense of drilling and tapping.

*And* . . . you get all of this at low cost! Standard parts make manufacture less costly. Goulds passes on the savings to you.

Find out how this maximum interchangeability can save you money by sending for Bulletins 721.6 and 722.6, or ask your nearest Goulds representative.

GOULDS PUMPS, INC., Dept. SPI-49, Seneca Falls, N. Y.

**GOULDS**

**PUMPS FOR INDUSTRY**

*Louisiana Company Cuts Costs 75%*

# Welds at 34 Inches Per Minute

By J. F. O'CONNELL & J. C. KELLEY*

**HIGHER SPEEDS** and lower costs aren't the only yardsticks of a new welding process, but they're good reasons for giving the process a try. And when this process also cuts spatter loss, requires virtually no post-weld cleaning, and increases weld x-ray quality, it proves to have definite production possibilities.

That's why J. B. Beaird Company, Inc., Shreveport, Louisiana, decided to try Linde Company's new, semi-automatic Unionarc welding process in the production of large storage tanks.

The process was used to make 5/16-in. fillet welds in the fabrication of 4-ft by 10-ft mild-steel storage tanks. The welds were made with Unionarc UAM-1 welding machines, 3/32-in. diameter Oxweld No. 43 wire, Unionarc CS composition, carbon dioxide shielding gas, and a current of 450 amp, 31 volts, DCRP.

Basically, the process was used for two jobs: 1) sealing girth joints prior to submerged-arc welding of the tank ends; and 2) fillet welding three stiffener rings per tank.

Joints were sealed to prevent welding composition and melted metal from falling into the tank during welding. Sealing was previously done by two operators, using covered-electrode welding, and required 23 minutes for each man. With Unionarc welding, one man does the job in 9 minutes — more than five times faster than manual stick-electrode.

Three stiffener rings are welded simultaneously on each tank — three operators each hold a torch in position against the turning tank and the welds are made "automatically." A total of 1650 ft of welds are made per 8-hr shift, compared to less than 350 ft with manual stick-electrode.

In addition to speed, five features of the process stood out in this application: 1) the equipment was portable, easily installed, and very maneuverable — thus simplifying the welding operations; 2) the welds were of higher x-ray quality than previous welds; 3) the protective welding composition usually peeled off by itself without any direct effort to remove it; 4) no post-weld cleaning or grinding was necessary and the smooth weld surface was ready for painting, and 5) the process required neither elaborate jigging nor highly-trained operators — the operators on this job had no previous experience with the process.

When the torches were mechanically positioned (sealing the girth joints), welds were made at 34 inches per minute. Due to the great savings in time, labor, and materials, actual welding costs with Unionarc on this application were 75% lower than with manual stick-electrode.

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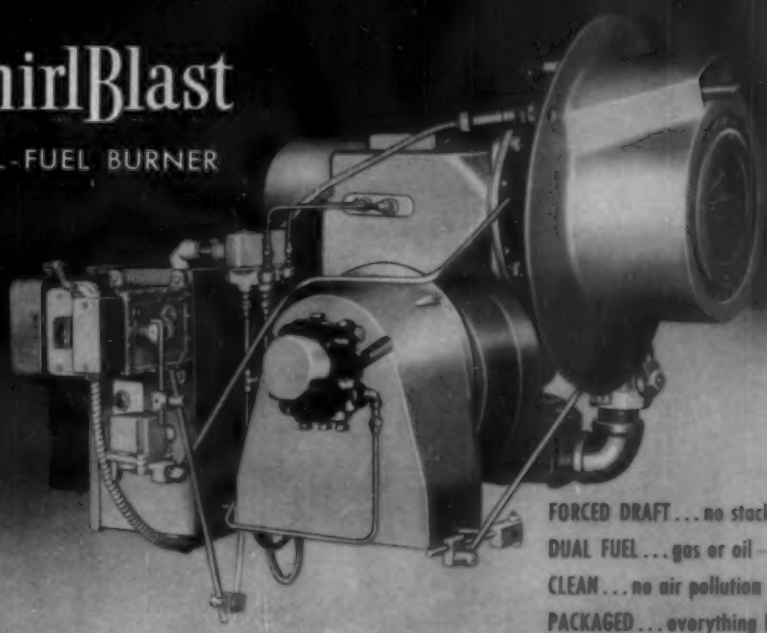
*Mr. Joseph F. O'Connell is Chief Welding Engineer, J. B. Beaird Company, Inc., Shreveport, Louisiana. Mr. J. C. Kelley is a Welding Sales Engineer, Linde Company, New Orleans, Louisiana.

With Unionarc welding, one man completes this storage tank in nine minutes — five times faster than the previous manual stick-electrode process.

A new development by Iron Fireman

# WhirlBlast

DUAL-FUEL BURNER



FORCED DRAFT . . . no stack draft required
DUAL FUEL . . . gas or oil — instant changeover
CLEAN . . . no air pollution
PACKAGED . . . everything built-in, ready to go

## New high in combustion efficiency and fuel economy

*with this revolutionary burner for medium size boilers*

This compact Iron Fireman WhirlBlast unit combines many of the advantages of big burners, yet it requires little more supervision than the oil or gas burner in your home.

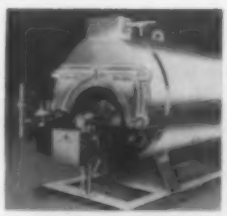
**No stack—no draft problems.** Air supply is precisely controlled under all conditions. The WhirlBlast burner eliminates the need for a costly and unsightly smokestack, and also eliminates the noise, bulk and high power requirements of induced draft firing. This burner starts clean and burns clean, with no soot or smoke problems.

**Steadiest flame ever developed.** In the new WhirlBlast firing head Iron Fireman engineers have solved the persistent problem of flame pulsation. A clean, steady, efficient flame is achieved without firebox vents or any other makeshift device.

**Fires gas or light oil; changes fuels instantly.** Quick fuel changeover can be accomplished with the flick of a switch, or automatically with special controls. Models available for firing either gas or oil exclusively.

**A true "package".** When you bolt the WhirlBlast unit to the boiler front you install a complete forced draft firing system, combining air and fuel systems and integral electronic combustion controls. It leaves the factory as an operating unit, factory wired and tested. Does not require refractory combustion chamber, nor any provision for secondary air supply.

**For all types of boilers.** The WhirlBlast burner can be purchased in two ways: as a boiler-burner unit (shown at right), or as a burner alone for use in your present boiler.



**Complete boiler-burner unit, ready to operate.** Boiler and burner compose a single unit, engineered, assembled, wired and tested at the factory, carrying factory responsibility. Requires little more than service connections when delivered to the job. Sizes from 15 to 100 boiler horsepower.

*Send for more information*

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Please send me more information and specifications on the Iron Fireman WhirlBlast burner.

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Firm_____
Address_____
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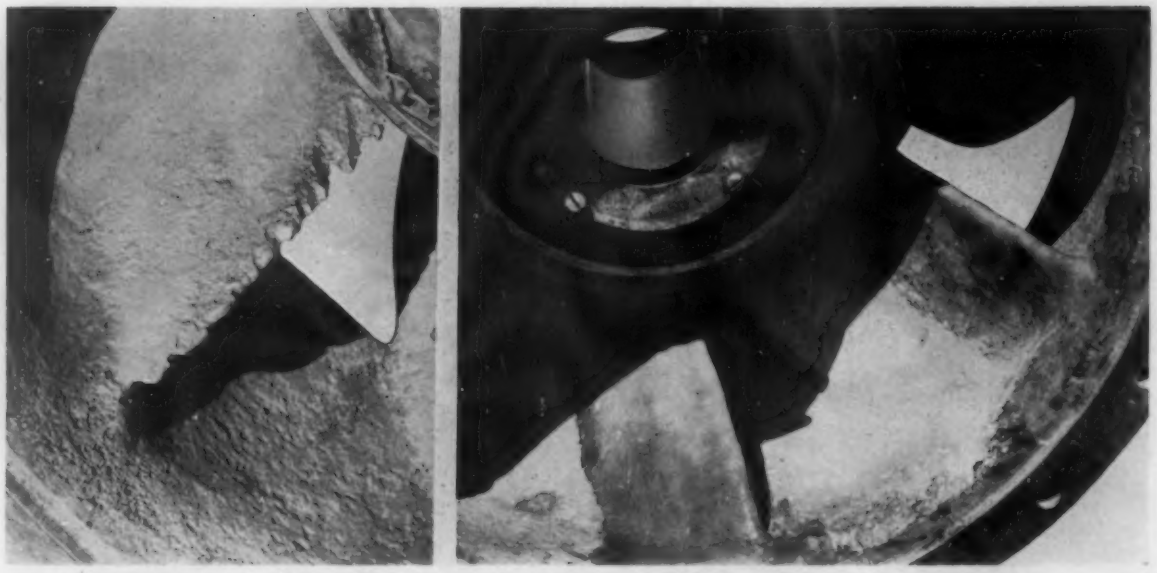

Photos show how damaged pump diffuser vanes (left) are now protected by Narmco resins and putties (right). Edges and complete surface of vanes are covered with the Narmco coating which is applied with alternate layers of fiberglass cloth.

## Experimental Coatings Seem Effective

**HIGHLY** corrosion-resistant resins and putties, developed for aircraft and missile applications, are now being experimentally used by a utility company to cut maintenance costs on sea water-buffeted pumps. The possible savings from the successful control of this maintenance hazard could amount to thousands of dollars annually.

Eight vertical circulating pumps propel 176,000 gallons of sea water a minute through steam turbine condensers. The big pumps, working virtually around the clock, present a challenging maintenance problem because of the corrosive punishment of sea water plus the battering action of sand and shell debris.

This continuous abrasive and corrosive attack seriously serrates diffuser vanes and scores deep pits and channels in the diffuser shell which eventually could wear through.

Some months ago, the utility began searching for a protective coating that would solve the costly maintenance problem. Experiments were conducted with a wide variety of protective coatings, including spray metals, welding, rubber compounds, neoprene, ceramics and many others. None solved the problem.

The utility firm then sought the assistance of an aircraft materials producer, Narmco Resins & Coatings Co. of Costa Mesa, Calif., which recommended the use of room-temperature-setting putty to fill the pits and channels in diffuser vanes and housing, and another aircraft product, a liquid resin, to protect the built-up areas against further sea water corrosion and abrasion.

The resistance of these coatings to abrasive action within the pumps is outstanding. Thus far, they show very little wear even after extended periods of continuous pumping operations.

One explanation for the outstanding resistance of the coatings is that, after curing, they apparently retain prolonged surface resiliency. Sea water abrasives appear to bounce off the elastic coatings, instead of rubbing and scouring them.

The cost of the coating job, including both materials and labor, is estimated at about $100 per pump treated. In contrast, the replacement of diffuser sections, if required, may cost several thousand dollars.

After thoroughly cleaning all components by sandblasting, a coat of resin was brushed on the pump interior surface. Next, the base fillet of the diffuser housing was built up with the putty. A woven fiberglass matrix was placed on the surface and coated with resin. This coating was then covered with a fiberglass cloth and the entire area again liberally coated with the liquid resin.


**SPI . . . 56th Year**

**REACHES** industrial plants (manufacturing, process, utility and large service) in the South & Southwest.

**SERVES** plant managers, superintendents, engineering department heads and plant operating staffs.

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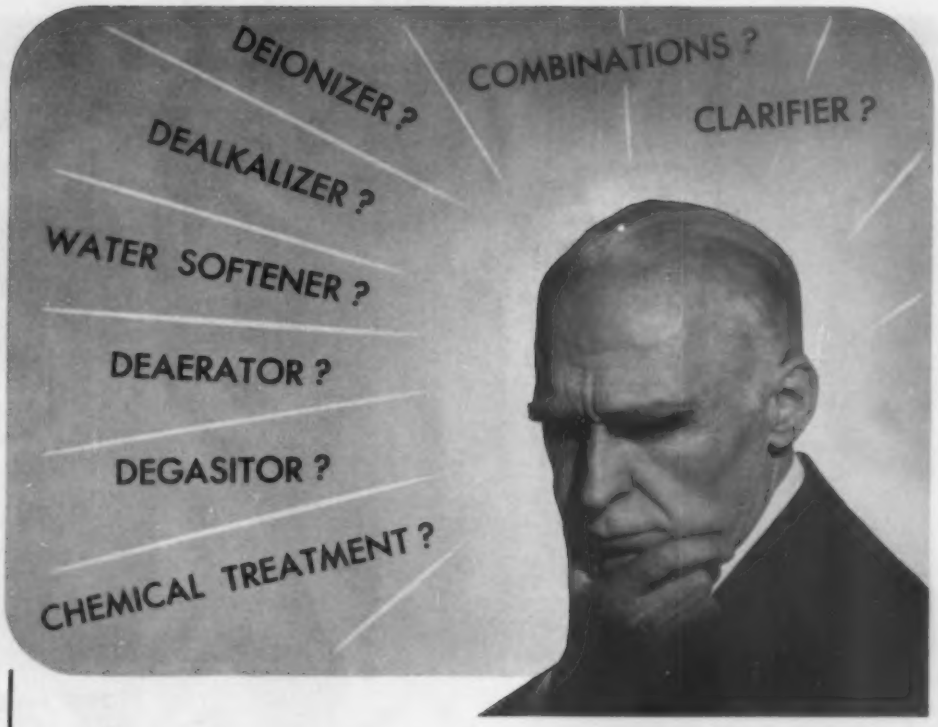



# *Confused* about your water problem?

It isn't surprising that you should be confused about your water conditioning problem when you think about the almost endless ways of solving it that are being thrown at you from all directions in these fast moving times.

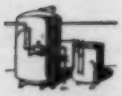
But instead of being confused, you should be happy that there *are* so many new roads open! Actually the confusion arises from the many new developments in water conditioning that have been crowded into recent years. And this is all to the good . . . for it means that today you can find a far, far better answer to your water problem.

Yes, your only basic problem is to sort out the one best way of meeting your particular needs from all the ways and means available today. This is the all important problem, but we have the answer to that one too: Simply take your set of conditions to a firm like Elgin—an organization that for more than fifty years has travelled all the roads of water conditioning—opened many of them. Out of Elgin experience will come the best, the most economical solution to your problem.

***NEW 24 page bulletin now on the press***

The up-to-date facts about Elgin equipment and service (briefly high-lighted here) will soon be ready for you in a new bulletin. It shows how Elgin experience—made available to you through your local Elgin representative—can give you the one best answer to your water conditioning needs.

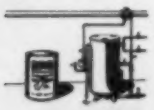
***Put yourself on the list to receive it!***



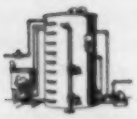
**ZEOLITE WATER SOFTENER** — manual and automatic. Up to 44% more soft water output from a softener of given size.

**ULTRA-DEIONIZERS** — produce highest quality mineral-free water. Replace distillation methods at fraction of distillation cost.

**DEALKALIZATION & ION EXCHANGE SYSTEMS**—Dealkalizers to control alkalinity. Ion Exchangers to produce water of any desired quality.

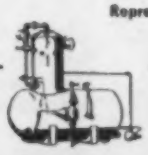


**CHEMICAL TREATMENT SYSTEMS**—prevent scale, corrosion and depositions with Elgin specially formulated chemicals.



**CLARIFIER**—for removing excess alkalinity and solids for clarification of turbid waters.

**DEGASITORS**—for removal of entrained gases from water by aeration.



**DEAERATING HEATERS**—supply make-up water pre-heated by exhaust steam in which $CO_2$ and oxygen are eliminated.

**WATER FILTERS**—Diatomite, sand, anthrafilt, activated carbon and oil removal filters in all types and sizes.

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**132 No. Grove Avenue, Elgin, Illinois**

**Representatives in Principal Cities** *In Canada: G. F. Sterne & Sons Ltd., Brantford*

ELGIN WATER CONDITIONING

*At Florence, Alabama . . .*

**20% More Space . . .**

Hand stacking was costly and full height of the storage room could not be utilized. Note in the right photo that the electric truck can easily and safely stack goods to the ceiling.

# Palletized System Pays Off

**THE** highly competitive nature of the food processing business makes it necessary to have every operation done as efficiently as possible. The high cost of building construction requires us to make the maximum use of space. The need for the immediate movement of frozen products into deep freeze refrigerators requires fast, dependable material handling equipment.

These were the factors we had to consider in planning the operation of our frozen food plant at Florence, Alabama. Our plant is small and compact. We make and freeze several kinds of meat pies and store them at zero temperatures until they are moved out to distribution centers.

We store raw materials as well as finished products. The storage area for our non-refrigerated items had been a costly, inefficient operation until we decided to palletize all goods as soon as they came into our plant. Unprocessed inventory consists of frozen meats and poultry, shortening, flour, dry ingredients, etc., as well as packaging supplies such as pans, boxes, waxed paper and cartons. Requirements for our immediate need are stored in our main plant, reserve stocks are placed in a warehouse across the street.

Under the original system all receipts were moved into storage on floor trucks and were hand stacked to a height of only 8 ft. This was a slow, heavy job requiring the services of several men. It was often necessary for them to work overtime in order to unload trucks arriving late in the day.

Under our new system all goods are palletized as soon as they come in and are moved into storage quickly with an electric fork truck. We can stack ceiling high so that the full cubage of our warehouse is used. At no extra warehouse cost we have obtained the use of 20% more space. A Raymond narrow aisle truck was chosen because it could be operated in the narrowest possible aisles.

Meat pies are manufactured on a production line setup and come off the end frozen, packaged and packed in cartons. Thirty-six cartons of pies are placed on a pallet and moved directly into the freezer on a hydraulic hand pallet truck. They are spotted in the freezer room to be stacked later by the electric truck. Here again we utilize the full capacity of our cold storage area by stacking within 12 in. of the ceiling. Storing on pallets also provides free circulations of frigid air so that every load is uniformly chilled.

**Many Savings** — In the general storeroom we have eliminated the need for three regular handlers. Without considering the overtime that was often required for manual handling, the direct labor saving amounts to nearly $7,000 annually. Another major saving is in the increased amount of usable storage space we enjoy. We gained

nearly 6000 cu ft of space by increasing the height of our stacks from 8 to 12 ft when we changed from manual stacking to the pallet and electric stacking truck. If we consider that 60 cents per cu ft is a fair estimate of the annual value of this extra space we find that another $3,600 is being saved each year with our new system.

Intangible benefits should be recognized too. Housekeeping, for instance, is greatly improved. The turn around time of our over-the-road trucks has been greatly reduced. Delivery has been speeded up. Worker morale has been greatly improved. Manual handling often required workers to remain in low temperature room as much as two hours, now the job is done in a matter of minutes. Nobody is required to stay in the zero room long enough to be uncomfortable. Palletization of all materials allows us to take an accurate inventory easily.

The cost of our electric truck, hand trucks and pallets is one of the best investments we have ever made.

*By JOHNNY O'DELL WITHERS, JR., Southern Frigid Dough, Florence, Alabama.*

## Quick Action Stops Fire

**HUMAN** alertness and the use of proper safety equipment prevented serious consequences when a flash fire broke out at the American Oil Company's 40,000-barrel capacity crude oil refinery at El Dorado, Arkansas.

Refinery Fire Chief W. C. "Collie" Vernon was the man who distinguished himself with quick thinking and prompt action at the refinery's "time of crisis."

The fire started suddenly when crude oil from a thermal cracking unit surge drum was accidently ignited as it flowed through a water drawoff valve to sewer facilities.

In the face of a critical, fast-developing fire situation, Chief Vernon hurriedly donned an M-S-A Aluminized Fire Suit.


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# Criss-Cross Braided Packings

A revolutionary Braided construction in which every strand passes diagonally *through* the body of the packing and becomes an integral part of the whole, making it stronger, longer wearing, better lubricated.

Belmont offers a wide variety of styles of Criss-Cross Braided Packings in long fibre Canadian asbestos, blue African asbestos, wire-inserted asbestos, flax, cotton, Teflon* yarn, Teflon ribbon and Teflon impregnated blue and white asbestos—for low, medium and high pressure service and temperatures to 700° F—sealing against steam, water, air, gases, oil, gasoline, alcohol, corrosive chemicals, and for positively non-contaminating service.

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7. Sheet Packings
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9. Metallic Packings
10. Plastic Packings
11. Expansion Joints

*du Pont Trademark

# BELMONT

The Belmont Packing and Rubber Company • Butler & Sepviva Streets, Phila. 37, Pa.

Safeguarded from burns by the heat reflecting, aluminized fiber glass clothing and suitably protected by fog nozzles, he moved through the flaming area to close the valve and shut off the flow of crude oil that had been feeding the fire.

While Chief Vernon's courage in meeting the responsibilities as he saw them was uniquely his own, the successful conclusion of his prompt reaction reflects the American Oil Company's close adherence to sound safety planning.

Since fires constitute a threat of complete destruction to plant facilities, fire fighting equipment and protective apparel are vital elements of the safety program at the El Dorado refinery.

It is impossible to estimate the extent of damage which may have conceivably resulted — if Chief Vernon had not acted swiftly, and if the M-S-A Aluminized Fire Suit, manufactured by Mine Safety Appliances Company for over 90% heat reflection, had not been readily accessible.

Some measure of the possible damage can be surmissed, however from the number and kinds of physical plant facilities that comprise the refinery. These include: a thermal cracking combination unit, two catalytic cracking units, a delayed coking unit, two ultraformer units, a gas concentration unit, an alkylation unit, a polymerization unit, a Poly Butane unit, a tetramer unit, treating plants and other processing equipment.

Recognizing that accidents occur and fires start despite all logical safety precautions, the American Oil Company refinery endeavors to maintain a readily available supply of appropriate protective equipment to meet every conceivable situation.

Success of the firm's well-balanced safety program is apparent in statistics covering the 600 employees at the El Dorado refinery — more than 291 days without a single loss-time accident.

## Reinforced Butyl Packing

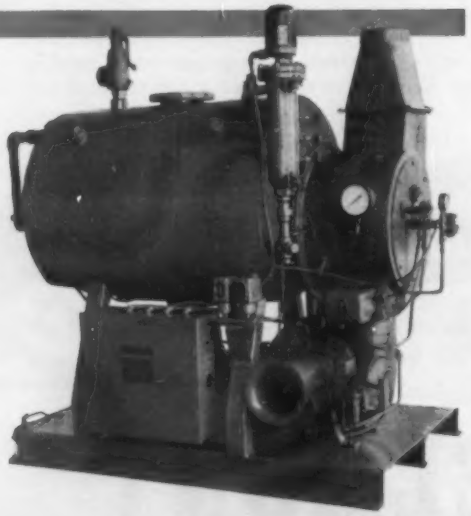
**FIRE RESISTANT** phosphate ester-based hydraulic fluids have been in extensive use for several years, and their advent has substantially reduced the hazards inherent in the application of old style inflammable hydraulic mediums. However, these synthetics have posed numerous packing problems because these new fluids are not always compatible with existing packing compounds.

This point was recently made apparent at the Alcoa, Tennessee plant of the Aluminum Company


*A lot of power in a little package*

TXT

**VAPORMATIC COIL-N-SHELL STEAM GENERATOR**



The Coil-N-Shell packs a lot of horsepower and steam generating capacity into a small space. It requires only a fraction of the space required by conventional boilers with rated steam outlet pressures from 5 to 150 psig . . . with a horsepower range from 35 to 300.

The Vapormatic Coil-N-Shell is an ideal steam generator for processing, cleaning, heating and other applications. It is completely automatic and all sizes have modulating controls as standard equipment. They are available with gas, oil and combination gas-oil fuel burning systems.

The Coil-N-Shell is a forced circulation, water tube type steam generator, employing an advanced method of steam generation. All component parts are integrally mounted on a common base, requiring only feedwater, fuel, steam and electrical connections to put it in service. It generates steam from a cold start in ten minutes and is ready for high temperature operation immediately.

For the utmost in simple, convenient, economical steam generation in the smallest space, specify the TXT Vapormatic Coil-N-Shell. Complete specifications, design and operating data, as well as rated capacities and performance features are contained in Bulletin No. 582 CSA. Write for your copy now.

TXT TEXSTEAM Corporation

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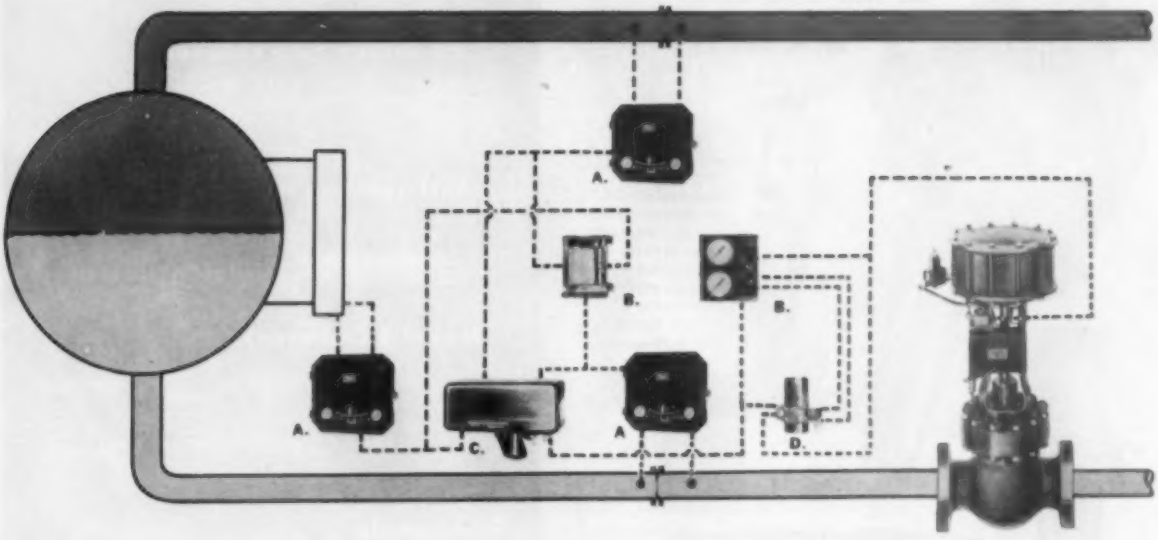
COPES VULCAN | BLAW-KNOX

*How Copes-Vulcan control systems boost power plant efficiency*




# Copes Feedwater Control brings stability to high-duty steam generators

To meet the higher ratings and fast load changes of today's boilers, Copes Type 3-L Feedwater Control combines the dynamic balance of custom-engineered control valves with precision-built instruments.

Feed to the boiler is modulated by steam flow, feedwater flow and drum water level. Feedwater input closely matches steam output on constant or varying loads. A stabilized water level is maintained regardless of changes in load or feed pressure, and while blowing down or blowing soot.

*A complete line . . . a complete service*

Over 50 years of design experience backs Copes-Vulcan's broad line of control systems for boiler cleaning, combustion, feedwater, pressure reducing and desuperheating operations.

*For details, write for Bulletin 1013-D*

**A.** Indicating transmitters send water level and flow influences to the computing relay where steam-flow and water-flow are accurately balanced.

**B.** Miniature recorders and transfer panel for console-type or graphic panels or for compact grouping on existing panels.

**C.** Compact beam-balanced type computing relay sends an air impulse to the controller and auto-manual transfer panel.

**D.** Transet controller provides two-knob tuning. Controller, transmitters and relays may be field mounted wherever most convenient.

**E.** Copes-Vulcan Type CV-P valve responds to minute changes in actuating impulse, delivers top power at the valve stem. For less demanding service Copes-Vulcan builds a diaphragm operated valve.

## Copes-Vulcan Division

**BLAW-KNOX COMPANY**

**Erie 4, Pennsylvania**

## As SIMPLE and Dependable as the Pull of a MAGNET!

A sleeve, raised and lowered within a non-magnetic tube, attracts or releases an Alnico magnet attached to a mercury switch. Basically, this is Magnetrol.

# MAGNETROL

## The Simplest, Most Versatile LIQUID LEVEL CONTROL Ever Devised!

Linked to liquid level by infallible magnetic force, Magnetrol is free from the limitations inherent in mechanical or electrical controls. With the actuating magnet rated at 98% of initial strength after 30 years, Magnetrol has *infinite operating life*, with practically no maintenance at all. *There's nothing to wear out*, nothing to fail.

What's more, Magnetrol's simple operating principle permits easy, economical modification of standard units to meet *any* pressure, temperature or corrosion requirements. That's why there's practically no limit to Magnetrol's use. It's also why "specials" are likely to be standard with us. Magnetrol units control level changes from .0025-in. to 150-ft. —with single or multi-stage switching.

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## Keep boilers on the line with WILSON TUBE MAINTENANCE TOOLS

**1** Heavy-duty air driven tube cleaners are designed to deliver maximum power at the most efficient cutter head speeds while negotiating sharp bends, the Model ECT Air Cleaners are excellent for cleaning curved boiler tubes from 2½" to 4½" O.D.

**2** Wilson Model 38 tube expanders are self-feeding and parallel expanding. They are of the single flare roll type. Available for tubes 1" O.D. to 4½" O.D. with various roll lengths for tube seats ¾" and up.

**3** Flaring type expander 1" O.D. to 4½" O.D. tubes, ½" to 2" tube seats.

**3A** Long reach type expander 1" O.D. to 4½" O.D. tubes, 2½" to 5" tube seats.

**4** This Wilson bevel gear drive is expressly manufactured to meet continuous and heavy duty service conditions. The one piece all steel body is extremely rigid and not subject to distortion. The maintenance of perfect gear alignment is assured with consequent long service life.

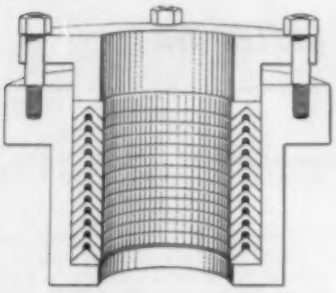
Write today for your copies of Wilson Tube Cleaner catalog No. 77 and Wilson Tube Expander catalog No. 88. TW-882

**Representatives in principal cities**

**THOMAS C. WILSON, INC.**
21-11 44th Ave., Long Island City 1, N. Y.
Cable address: "Tubeclean", New York

# WILSON
TUBE CLEANERS • TUBE EXPANDERS

of America. Here, a 250 ton hydraulically operated wheel type press, operating at pressures from 500 to 1500 psi, is presently being used to straighten heat-distorted rectangular steel smelter pot shells.



This horizontal, 18 inch stroke press has a 13 inch ram which was packed with a special duck and rubber compound "V" type packing when fire resistant fluid was first used as the hydraulic medium. Serious leaks developed around the stuffing box which could be stopped on the outward stroke by tightening the packing gland; however, this necessary tightening caused excessive binding of the packing on the ram which made the counterweight type pull-back ineffective.

In an effort to solve the problems connected with packing and pull-back, Alcoa maintenance engineers ordered duck reinforced Chevron butyl packing. The application of the relatively flexible packing set, consisting of top and bottom adapters separated by C rings, brought the leakage under full control and permitted the use of the counterweight type pull-back by the addition of a simple air cylinder. Butyl rubber packings are relatively new to the packing industry, primarily due to butyl's lack of resistance to mineral base oils. However, butyl's superior resistance to the rubber-destroying characteristics of pure phosphate esters has given the compound a new and important packing role.

The use of Garlock Style 433 Chevron packing in this instance enabled Alcoa to eliminate a fire hazard through the use of fire-resistant fluid which would not have been economical if the use of conventional type packing had been continued.


# The most efficient operating cyclone collectors made

**Design makes the difference:** in over a thousand plants across the continent, Buell Cyclones have *proved* themselves more efficient than any other cyclones made. Buell's exclusive Shave-off port (A), traps the extra percentage of dust that ordinary cyclones lose. And large-diameter (B), custom-engineered design eliminates bridging, clogging, or plugging during operation, keeps efficiency high without interruption. Regardless of your present or planned plant layout, Buell equipment can be designed to solve your dust collection problems efficiently and economically. There's valuable information in a concise booklet, "The Exclusive Buell Cyclone". Write Dept. 80-D, Buell Engineering Company, Inc., 123 William Street, New York 38, N. Y.

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"SF" ELECTRIC PRECIPITATORS

PRECIPITATOR-CYCLONE COMBINATIONS

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**DUST COLLECTION SYSTEMS**

# NEW Catalogs & Bulletins

*. . . there is always a BETTER WAY*

### MAINTENANCE—TOOLS EQUIPMENT & METHODS

**1—Neoprene Rubber-Coating**—Charcote, a waterproof protective barrier against rust and corrosion described in 4 p bulletin. Offers plant engineer outstanding protection against corrosive fumes, salt spray, abrasion and moisture. — CHARLESTON RUBBER CO.

**2—Electrical Maintenance** — New contract service (for Southeast only) inspects and tests motors, generators, gearing, control & distribution systems, etc., at a cost less than 1% of value of equipment.—Atlanta office of WESTINGHOUSE.

**9—Rust Solvent** — Data sheet describes "Liquid Wrench" a penetrating rust solvent that loosens rusted bolts, nuts, screws and "frozen" parts. Safe for all metals and alloys. — RADIATOR SPECIALTY CO.

**12—Lubricator Vacuum Type Pumping Unit**—If your plant is experiencing difficulty with visibility and excessive maintenance on lubricator sight glasses, the new 82 vacuum pumping unit will offer lower cost. Form 1263 gives principle of operation and advantages.—MANZEL.

**33—Air Compressor Rod Packing** — Catalog 56 shows how "Compressor" No. 760 stays flexible under intense dry heat and protects rods from premature wear.—THE BELMONT PACKING & RUBBER CO.

**70—Multi-Purpose Grease** — Bulletin describes new single product Gulfcrown grease (4 consistencies) that does the work of many—simplifies application and avoids errors, reduces inventory and cuts lubrication costs; grease gun or centralized system application. — GULF OIL CORPORATION.

**86 — Tube Expanders** — 120 page Catalog 88 covers expanders and repair tools for boiler and heat exchanger tubes. — THOMAS C. WILSON, INC.

**94 — Corrosion Control** — Booklet, 20 pages — "Corrosion Control of Electric Light and Power Structures and Equipment" is designed to give company field operating men practical painting information on all phases of transmission and distribution work. Applicational photographs. — SUBOX, INC.

### FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

**107—Proportioning Pumps**—4 p brochure illustrates and describes company's proportioning pumps and package chemical feeding units. Includes applications and specifications.—BIRD ARCHER CO.

**123 — Slurry Pump** — Catalog describes the new SP-90 slurry pump which permits proportion of slurries in the mix tank to remain constant, with pumping rates variable from maximum to 1/5 of maximum.—MANZEL.

**146 — Vertical Sump & Process Pumps** — 12 page Bulletin 726.2 describes new line of heavy duty vertical centrifugal pumps for wet and dry pits to 20 ft. Single and duplex units. Capacities to 1,080 gpm. For regular sump service or wide variety process applications.—GOULDS PUMPS, INC.

**165 — After Cooler** — Bulletin 130 shows how the Aero unit removes moisture from compressed air or gases; cools water for jackets and intercoolers; cools air or gases in both power and process systems; and protects air tools and pneumatic systems from water damage.—NIAGARA BLOWER COMPANY.

**182—Centrifugal Fan Equipment** — Catalog 515 covers complete, ready-to-run centrifugal fan equipment. Capacities 400 to 14,000 cfm. V-belt and direct drive units. Universal discharge feature. Available for outdoor installation. — CLARAGE FAN CO.

### INSTRUMENTS—METERS CONTROLS—REGULATORS

**200—Control Centers**—Built to specific needs of the job to prevent costly breakdowns later. Units custom-built from best components. Specializing in quick deliveries. — THOMAS B. COMBS COMPANY.

**201—Valves & Gages**—Handy guide No. 36 gives data & prices on valves, liquid-level gages & accessories for process and power industries. — PENBERTHY MFG. CO.

**206—Process "Indicator"**—Catl. 100 B shows how you can have maximum info on all process variables with Panalarm annunciators. Trouble anywhere is signalled instantly — before it can grow big and expensive.—PANELLIT, INC.

**223—Combustion Control** — Bulletin 1023, 24 pages—Contains actual installation photos and diagrammatics of Bailey air operated combustion control for oil and gas fired boilers; two pages of chart records and six page list of typical installations. — BAILEY METER COMPANY.

**228—Fuel Cut-Outs & Water Level Alarms** — Brochure D2 — Electrode type equipment for installation on water columns to provide fuel cut-out, high and low water level alarms and pump cut on and off. For pressures to 2500 psi. — RELIANCE GAUGE COLUMN CO.

**241 — Liquid Level Controllers** — Catalog No. 405 illustrates and includes technical, instructive and descriptive information on the 12,000 Series variable-displacement type controllers. — MASON-NEILAN.

**248—Pump Pressure Regulators** — Bulletin 5306 describes constant and differential pump pressure regulators for steam turbines, reciprocating and motor driven pumps. Complete sizing and capacity information as well as construction features. — LESLIE CO.

**266—Feedwater Regulators** — 12 p Bulletin 1003-A describes boiler feedwater regulators and explains principle of feedwater regulation. Curves, charts, piping diagrams and specifications. — COPES-VULCAN.

**297—Remote Signal Alarms**—Bulletin WG-1824 describes how lights on horns, operated by in-

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Atlanta 8, Ga.

dicator control unit give instant warning of any serious deviation from normal boiler water level. — YARNALL-WARING COMPANY.

### PLANT CONSTRUCTION—WELDING EQUIPMENT—SPECIALTIES

**300—Fact Folders** — 23 up-to-date industrial fact-file folders on aluminum, steel, copper, stainless steel, insulation, roofing and other industrial supplies immediately available from 9 Southern warehouses. — REYNOLDS ALUMINUM SUPPLY CO.

**304—Backing Rings** — Bulletin 56-2 describes rings designed for fast economical fit-up in piping, tubing, fittings and valves. Shows how rings assure uniform complete-penetration welds and ease of handling in both shop and field. Carbon steel, wrought iron, chrome alloys, stainless, aluminum and copper.—ROBVON BACKING RING COMPANY.

**313—Ice Making Machine**—Packaged unit ideal for remote locations in sizes from 150 lb/day to 2000 lb/day; choice of electric motor or gasoline engine drive. — EQUITABLE EQUIPMENT CO.

**316—Drainage & Construction**—Catalog Gen-10658 includes data on drainage and construction products for industrial uses. Includes corrugated metal pipe, paved-invert pipe, Asbestos-Bonded pipe, Multi-Plate pipe, pipe-arches, perforated pipe, water control gates, etc. — ARMCO DRAINAGE & METAL PRODUCTS, INC.

**319—Portable Band Saw** — Bulletin describes the Kalamobile, a portable metal-cutting band saw. Has rubber-tired 12" wheels and telescoping handles. Capacity 6" rounds - 10" flat. — Machine Tool Div., KALAMAZOO TANK AND SILO CO.

**338—4-D Wrought Iron** — 8 p booklet discusses 4-D Wrought Iron which is 25% more corrosive resistant than standard wrought iron. Illustrated test section, applications and service conditions included. — A. M. BYERS CO.

**380—Compressed Air Dryers** — 12 p Bulletin describes heatless air dryers that extract both water and micronic particles; reduce moisture to zero dewpoint. 23 sizes range from 25 cfm for single instrument to 3000 cfm for entire plant air system. — VAN PRODUCTS CO.

**382—Hydraulic Cutters** — Bulletin No. 755 describes one-hose hydraulic rod and bar cutters. Three cutterheads and 3 power units available to handle cuts up to 1⅝" in diameter. Illustrations, specifications and technical data.—H. K. PORTER, INC.

**386—Rigid Frame Buildings**—8 page bulletin "Dixisteel Rigid Frame Buildings" — low cost, flexibility of design, durability, and minimum maintenance; also triangular or bow-string truss all-steel roof systems; fabricated for rapid erection. — ATLANTIC STEEL COMPANY.

**387—Track Accessories** — Catalog 575B describes complete line of track accessories — angle and splice bars, bumping posts, car blocks, push cars, rail anchors, rail skates, track tools, etc. — L. B. FOSTER CO.

### PIPING—VALVES—FITTINGS STEAM SPECIALTIES—TRAPS

**402—Forged Steel Valves**—General Purpose Valves, Supplement No. 1 to Catalog F-9, covers gate, globe and angle valves. ½" thru 2" sizes, for 150-800 pound service. Featuring 13% chrome stainless steel trim with hard facings. — HENRY VOGT MACHINE CO.

**403—Valve Operators**—Folder shows how re-designed sprocket rim makes any valve readily accessible from the floor. Simplifies pipe layouts, prevents accidents, fits all valve wheels. — BABBITT STEAM SPECIALTY CO.

**415 — Steam Trap** — Bulletin No. 455 - B describes the Float-Thermostatic steam trap with its entire operating element in one unit making it removable without disturbing inlet and outlet connection to the semi-steel trap body, suitable for 125 psi steam pressure.—SARCO COMPANY, INC.

**417—Welding Fittings** — 192 page Cat. 54 gives design data on piping and piping application including digests of specifications, working pressures, design formulas, etc. Covers welding fittings, prefabricated pipe, forged steel flanges, and pipe coils. — MIDWEST PIPING COMPANY, INC.

**420—Valves** — 24 page Catalog illustrates and describes bronze, iron, steel and corrosion-resisted valves, for controlling the flow of water, oil, gas, steam and corrosive fluids. — THE WM. POWELL CO.

**421 — Air and Gas Traps** — 8 page Bulletin No. 289 describes complete line of ball float traps for draining water from air, gas or steam lines or draining a light liquid from a gas under pressure (for pressures to 900 lb). Includes: installation, selection and ordering information. — ARMSTRONG MACHINE WORKS.

**443—PVC Fittings & Flanges**—Corrosion resistant polyvinyl chloride pipe fittings & flanges covered in 12 p catalog, featuring characteristics, advantages, limitations, operating pressures, temperatures, field tests, etc.—GRINNELL COMPANY, INC.

**451—Aluminum Jacketing & Elbows** — Folder J-1 describes aluminum protection for insulated lines, elbows, towers, vessels and tanks. Jacketing in 5 thicknesses, 2 alloys. Ell-Jacs in 60 sizes both for 90° and 45° ells. — CHILDERS MANUFACTURING CO.

**479—Multiport Drainers** — Publication 5201 containing 8 pages describes units for removing large quantities of condensate under vacuum or pressures, as from evaporators, heaters, separators, coils, or steam lines (up to 200 psi maximum). Lists discharge capacities, shows features and typical installations. — COCHRANE CORPORATION.

### BOILERS—STOKERS TURBINES—BURNERS

**501—Package Boiler**—New compact, low cost package unit (oil or gas fired) for small space requirements is described in Bulletin DK-1. Pressures to 325 psi, steam capacities to 45,000 lb/hr.—E. KEELER CO.

**504—Steam Generators** — Bulletin AXY - 1 describes auxiliary equipment and design features of the Amesteam Generator for sizes 10 through 600 hp and illustrates how this integrated design reduces cost and increases life and reliability.—AMES IRON WORKS, INC.

**505—Refractories** — Paco High Heat Duty and Super Duty Plastic Refractories. Fire brick, high temperature cement, castables. Installation and engineering service. Free estimates and inspection. — NORTH STATE PYROPHYLLITE CO.

**510—Stokers**—Application & operation of A.E. Type "H" & "R" and Vibra-Grate stokers described in latest bulletins. Latter burns low grade fuels without smoke. No dust collectors necessary. — AMERICAN ENGINEERING CO.

**513 — Power Plant Equipment** — 12 page booklet No. 1022-B gives details on combustion and boiler feedwater control, pressure reducing, desuperheating and automatic soot blowing — retractable and rotary. — COPES - VULCAN DIVISION, BLAW-KNOX COMPANY.

**516—Small Boiler Performance** — 4 p Bulletin shows how the packaged Ljungstrom air preheater boosts

## Bulletins (Cont.)

performance. Boilers as small as 25,000 lb/hr can have advantages of regenerative preheating—saves fuel, boosts output, and permits use of lower grade fuel.—THE AIR PREHEATER CORPORATION.

**540—Coal for Heating & Cooling** — 16 page brochure describes boiler plant for heating and cooling the Hillside, Ill. Shopping Center. Drawings show the boilers and coal and ash-handling equipment. — BITUMINOUS COAL INSTITUTE.

**549—Firing Systems** — Folder No. 5843 describes industrial packaged forced-draft firing systems for dual-fuel or single-fuel firing of high or low pressure natural, LP or manufactured gas or any grade of oil from No. 2 thru No. 6 in Scotch marine, steel firebox, water tube or cast iron boilers. Illustrated.—IRON FIREMAN MFG. CO.

**550—Coal Crushers**—Catalog 784-C describes single and double roll crushers, swing hammer pulverizers for all sizes of plants.—JEFFREY MANUFACTURING COMPANY.

**574—Packaged Generator**—Bulletin 582 describes Vapormatic Coil-N-Shell Steam Generator for service requirements of 5 to 150 psig. Gives operation features and specification data. Available with gas, oil, and combination gas/oil fuel systems. — TEXSTEAM CORP.

**587—Steam Turbines**—Single Stage —Bulletin 500 describes features and characteristics of company's type DH steam turbines in horizontal and vertical models. — DEAN HILL PUMP COMPANY, INC.

**591—Steam Generators** — 18 sizes, from 20 to 600 bhp, for pressures to 250 psi, also for hot water. Complete details in Catalog 811F. — SUPERIOR COMBUSTION INDUSTRIES, INC.

### ENGINES—DRIVES POWER TRANSMISSION MATERIALS HANDLING

**601—Crane Runway Rails** — Catalog gives information on crane rails, angle bars, crane stops, rail clips, hook and anchor bolts, bearing plates. Also specifications on various sizes of crane rail clips and explains how to order rails. — L. B. FOSTER CO.

**614—Vertical Transportation** — Elevator Catalog — Describes and illustrates details of passenger and freight elevators, escalators, dumbwaiters, and modernization and maintenance equipment for use in industrial, utility and service plants. — OTIS ELEVATOR CO.

**620—Shaft Couplings** — Bulletin 98 describes various applications of full-floating shaft couplings. Used to connect shafts that are spaced far apart. — THOMAS FLEXIBLE COUPLING CO.

**629—Longer V-Belt Life** — 12 page Bulletin 20x6234C describes various types of V-belts and tells how to select and match them. Lists seven steps for correct installation and hints for making them last longer. — ALLIS - CHALMERS MFG. CO.

**632—Gearmotors & Package Drives** — 8 p booklet DB-3650 illustrates horizontal, vertical, right angle, open, enclosed, explosion-proof, a-c & d-c units with respective reduction ratios and output speeds. Speed range from 7.5 to 780 rpm. — WESTINGHOUSE ELECTRIC CORP.

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**661—D-C Crane Control**—8 p Bulletin GEA-6434 features precision hoist, bridge and trolley control systems. — GENERAL ELECTRIC CO.

### WATER TREATMENT—HEATING & AIR CONDITIONING—DUST & FUME CONTROL—REFRIGERATION

**704 — Water Conditioning** — Brochure describes company's engineering services — zeolite water softeners, filters and purifiers, modernized and rebuilt water softeners, aerators and degasitors and process and boiler water conditioning. — SOUTHERN WATER CONDITIONING, INC.

**706—Automatic Roof Cooling**—Bulletin shows how automatic evaporative roof cooling can reduce inside temperature 8 to 15° without air conditioning; increase roof life; and reduce fire hazards. Many Southern installations. — APRIL SHOWERS — SOUTHERN.

**708—Zeolite Softener** — 8 p Bulletin 4530-A discusses the hydrogen zeolite process — its advantages, chemistry and neutralizing variations. — COCHRANE CORP.

**710—Scale Remover**—Bulletin shows how Anco Scale Remover quickly eliminates scale in boilers, water lines, refrigeration and air conditioning systems.—ANDERSON CHEMICAL COMPANY.

**713—Electric Precipitators**—26 page Bulletin 104 shows how units meet five engineering requirements —Positive control of gas flow; high, uniform electrode emission; Effective continuous cycle rapping; and Safe, trouble-free high voltage equipment. Gives 9 time-tested steps to a successful installation. — BUELL ENGINEERING COMPANY.

**739—Air Engineering** — 8 p Bulletin 135 illustrates and describes air engineering apparatus for process industries. Includes after-coolers, air conditions, liquid coolers, heat exchangers, condensers, refrigeration equipment. — NIAGARA BLOWER.

**748—Stop Fungal Decay** — Bulletin MT-58 describes company's preservative wood treatment for cooling towers, pinpoints organisms that destroy effective performance and prescribes treatment that arrests these destructive organisms, as well as the application techniques. — THE MARLEY COMPANY.

**779—Water Screens** — Bulletin contains information on traveling water screens for positive removal of floating debris and suspended matter from power station and water treatment plant influent. Includes data sheet for estimating. — JEFFREY MFG. CO.

**794—Refrigeration Compressors** — Bulletin 112-J describes the applications and specifications of heavy-duty compressors for all types of refrigeration service. Pictures many typical installations and uses. — FRICK CO.

### ELECTRICAL

**815—Induction Motors** — How spiral ventilation of two-pole motors eliminates hot spots and cuts windage noise described in Bulletin O5B8123A. Fans drive air thru holes in yoke, cooling stator lamination pockets, stator coils and absorbing heat from the rotor.—ALLIS-CHALMERS.

**819—Plug-In Power Distribution** — 24 p Book GEA-6173 describes 225-1000 amp plug-in Flex-A-Power busway with aluminum conductors. Lists features, applications, ratings, construction and installation information and specifications. — GENERAL ELECTRIC CO.

**855—Wiring Analyzer** — 4 page bulletin describes Model 301 Adequate Wiring Analyzer which quickly, simply and easily tests wiring without confusing calculators or slide rules.—SPRAGUE ELECTRIC.

## Photography

(*Continued from Page 66*)

tures shot at more than 3,000 frames per second on a high speed camera. When run through a projector at normal viewing speed, the slow motion of the high-speed movies makes possible extremely detailed studies leading to the design of better drill bits for the particular job at hand.

**Case 7 — Louisville, Ky.**

Of course, the field of sales and sales promotion are most frequently thought of as areas for photographic applications. However, even in this well-worked territory, it can pay for industrial management to think of new and improved ways in which photography can do a job more effectively.

There's a good illustration of using photography in sales in the case of the Brown-Forman Distillers Corporation, Louisville. This firm, obviously, is in a field where one of its prime sales objectives is to get retail liquor stores to use displays featuring their merchandise. There is a constant search for new ideas and new techniques. Salesmen are encouraged to use their own ingenuity and to check continually for any ideas which individual dealers might develop.

Obviously, photographs are an ideal means for exchanging information and ideas on display techniques. Brown-Forman has set up really blanket photographic coverage of their trade simply by giving each salesman an inexpensive camera. With only a few basic directions, each salesman is able to go into the field and shoot highly usable photographs wherever and whenever he runs across them. Rolls of film are channeled into the central photo department in Louisville for processing and distribution of prints.

There are many other places in industry where photography can save time and money. Maintenance is certainly one place where photographic records pay big dividends, but we have touched on that in a previous article. Soon we shall discuss photography as a training aid.


3 Steps to QUICK steel

1 CHECK YOUR NEEDS  2 CALL ATLANTIC STEEL  3 OPEN YOUR DOOR

STEEL WAREHOUSE SERVICE
You Can Always Count On

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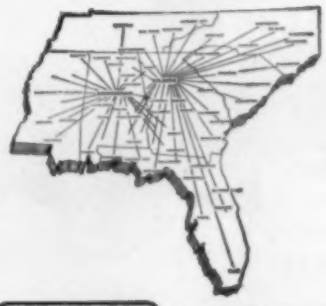

The minute your order is received, it is on its way to being filled and shipped. One of the South's largest and widest varieties of steel warehouse products, plus a willing organization coupled with the most modern facilities, makes this possible. So when you want steel or aluminum, and need it in a hurry, call Atlantic.

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Atlantic Steel Company

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For more information, use Reply Card—Page 81

# NEW Product Briefs

*. . . there is always a BETTER WAY*

## Duplex Recorder

E-1 A compact, general-purpose recorder, the CH-37 Duplex, for plotting two related electrical quantities side-by-side on a single chart has been announced by **General Electric Co.**, Schenectady 5, N. Y.

The double record on a single roll permits faster reading and helps eliminate possible reading errors associated with matching separate charts when correlating quantities such as watts and vars, volts and frequency, or wind direction and speed.

## Tube Expander Drives

E-2 New air-operated, magnetically-controlled tube expander drives for fast precision tube rolling have been developed by **Elliott Co.**, Lagonda Plant, Springfield, Ohio. They are available in two models, in order to handle the complete range of tube rolling requirements of the many types of heat transfer equipment. The standard model is illustrated here.

Both units have a unique method of controlling rolling action by means of a powerful, permanent magnet set that disengages and stops the rolling instantly, when preset torque levels are reached. This permits continuous motor operation and smooth, shockless pickup. There are no springs, clutch, ratches, or friction-loaded parts to alter or require adjustments with age.

LOOK FOR QUALITY

in your hot water generator...

look to FINNIGAN

Finnigan Hot Water Generators are engineered to give you large quantities of hot water for low operating cost. The finest materials, creative skill and quality construction assure efficiency in Finnigan equipment. These generators are fabricated from corrosive-resistant materials and contain copper removable-coil heating elements. Before leaving the plant, each generator must conform to ASME, API, U. S. Government and other specifications. "Fabricated by Finnigan" is your assurance of quality.
Finnigan builds hot water generators to your specifications. Call, wire or write today for complete information with no obligation to you.

TANKS, SMOKESTACKS, PIPING, WATER HEATERS, BREECHING, PLATE WORK.

J.J. FINNIGAN CO., INC

722 Marietta St., N.W. Atlanta, Georgia
Birmingham 5, Alabama, 1107 Seventh Ave., South
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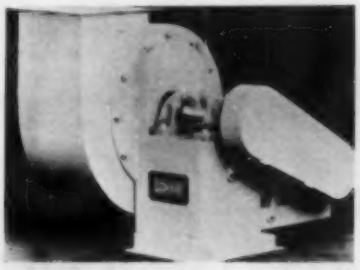
Dallas 9, Texas, 4431 Maple Avenue
Washington, D.C., 3714 14th St., N.W.
Kansas City 41, Mo., 1720 Harrison St.
Memphis, Tennessee, 5930 Laurie Lane
Jacksonville 4, Florida, P. O. Box 2527
Little Rock, Arkansas, 4108 C. Street
New Orleans 25, La., 4054 Thalia Ave.
New York 17, New York, 41 E. 42nd St.

## Induced Draft Fan

E-3 Fuel savings and lower stack maintenance costs result when hand-or-mechanically-fired boilers are equipped with specially-designed Lehigh Induced Draft Fans, it has been announced by **Lehigh Fan and Blower Division**, The Fuller Co., Catasauqua, Pa.

Featuring an unusual radiant heat cover between the bearing and the fan housing, the new fan maintains a constant, controlled over-fire draft, thereby increasing fuel combustion efficiency and eliminating need for large, unsightly stacks.

Capable of handling combustion gases up to 800 F, the fan is of all-welded mild steel integral construction to prevent distortion at high temperatures. The radiant heat cover, together with an aluminum heat flinger device, prevents excessive heat radiation and permits use of standard pillow block bearings.



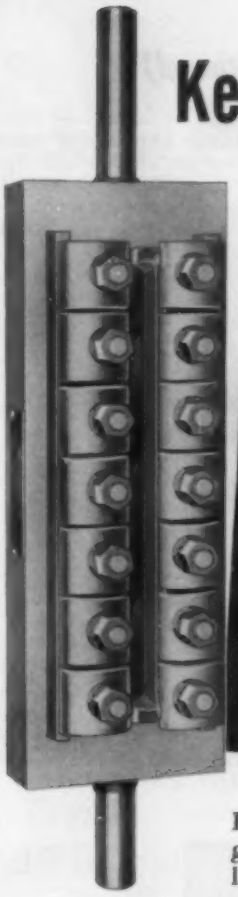
Stub stacks can be installed directly on the fan without additional supports due to the fan's heavy, all-steel construction. Direction of fan rotation and location of fan discharge outlets can be specified to suit any type of installation.

**For More Free Data FILL IN CODE NO. on the Handy Return Card — Page 81**

## Power Units

E-4 Introduction of four new industrial power units has been announced by **Ford Division of Ford Motor Co.**, Box 608, Dearborn, Mich.

The new power units are built around Ford's 330 cubic inch six-cylinder diesel engine and the three new Super Duty gasoline engines of 401, 477 and 534 cubic inch displacement. Ford already offers power units for its other diesel and gasoline-powered industrial engines, beginning with the 134 cubic inch engine.

# Keep the "eyes" of your boilers safe

*... to protect life and property*

Use
**Reliance Water Gage Inserts**
for leak-tight shatter-proof service

New Reliance Mica-protected Flat Glass Gage Insert for steam pressures to 1500 psi. Rigid wide body; improved Reliance finger-type clamping principle.

Reliance PRISMATIC Gage Insert shows sharp black-white contrast between water and steam. Models for pressures to 350 psi.

It's false economy to "scrimp" on water gages. These vital basic checks on water levels should be of highest quality, assuring continuous clear reading, and safety for workers and equipment . . . A few hints worth considering:

1. See that you have gage inserts on all boilers and supplementary vessels corresponding with the design pressure.
2. Insist on frequent inspections and maintenance to *prevent* trouble.
3. Keep spare inserts and replacement parts on hand for prompt use when needed. (Many plants use spare inserts when necessary to keep gages in continuous service — make repairs when convenient.)

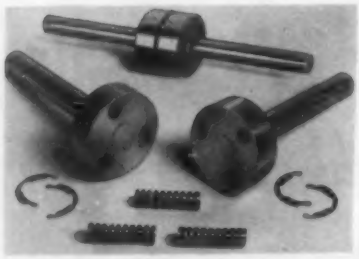
Reliance, oldest manufacturer *specializing* in boiler safety equipment, makes water gage components for all pressures, any visibility range. Also direct-to-drum assemblies. Extra strength — a generous margin of safety — is built into all Reliance products. When you write, please mention your working pressure.

**The Reliance Gauge Column Co.**
5902 Carnegie Avenue • Cleveland 3, Ohio

BOILER SAFETY DEVICES
**Reliance**

1884 75 YEARS 1959

## New Product Briefs (Continued)



### No Nuts or Bolts in Free-Aligning Coupling

E-5 A shock absorbing, free-aligning coupling produced by **Atomic Manufacturing Co.**, East Pittsburgh, Pa. permits maximum misalignment because it transmits torque without end thrust, even under load. Halves of the coupling are joined and transmit thrust through helical, wire springs which are held in place by snap or split rings. It operates in either direction of rotation and can be installed vertically without any parts change.

The couplings have a load factor of 7:1. Although available in any size, they are standardized in 3 series — shaft diameters up to 2", 2"-5", and 5"-12". The coupling is usually of all-steel construction, however, other alloys have been used for operations in corrosive atmospheres.

### High Vacuum Air-Cooled Pump

E-6 A newly designed Model 106 high vacuum pump unit with six sets of dual vanes providing positive high-pressure oil seal and utilizing a patented radiator oil-cooling system, has been announced by **Leiman Bros.**, 102 Christie St., Newark 5, N. J. The pump provides a steady vacuum of 29.9" hg in continuous operation, at an average temperature of 200 F and has a capacity of 50 to 105 cfm. The over-all unit dimensions are 47" long, 36" high and 26" wide.

### Unit Heater Control

E-7 The new Type CUH Combination Unit Heater Control by **Sarcotherm Controls, Inc.**, 635 Madison Ave., New York 22, N. Y., combines in one enclosure, a number of accessories used in unit heater control. All of the equipment is mounted on the removable cover plate of a standard 3-gang wall box, which facilitates installation and wiring. Its control may be either wall-mounted or flush-mounted.

The Type CUH control includes an accurate line voltage thermostat, manual starter with thermal overload protection, summer-and-winter switch that permits fan operation alone in summer, pilot light indicator for fan operation, and terminal block accommodating line to service, fan motor, and optional low limit acquastat or pressure stat.

RACK UP BIG SAVINGS . . .
*Build your materials storage racks with*
**NU-RAIL**
SLIP-ON FITTINGS *and Std. I.P.S. Pipe*

Pallet Racks

Sheet Racks

Bins

**No Threading! No Welding!**

NU-RAIL high-tensile aluminum fittings *slip on* the pipe, and the unique offset design permits as many as three pipes to pass each other without cutting.

Any man in your maintenance or warehouse departments can build sturdy racks with only a hex key and a hacksaw, using new or used pipe in standard I.P.S. pipe sizes. Completely flexible . . . adjust to meet changing requirements. 100% pipe salvage.

**The Hollaender Manufacturing Company**
Bulletin 21SP, 3841 Spring Grove, Cincinnati 23, Ohio

**DEPENDABLE**
**100% AUTOMATIC**
**REMOTE READING**
**Tank Contents Gauges**

- RELIABLE
- NO POWER REQUIRED
- UNDERWRITERS' APPROVED

Liquidometers use a temperature compensated balanced hydraulic system. Indications unaffected by changes in specific gravity. All models feature large easy-to-read dials. UL approved switches available.

**Write for complete details to Dept. F.**

Since 1920 ...of proven quality

**THE LIQUIDOMETER CORP.**
**LONG ISLAND CITY 1, NEW YORK**

## Heat Pump Btu Meter

E-8 A new Heat Pump Btu meter that accurately measures both heating and cooling consumption in commercial installations has been announced by **Air Conditioning Equipment Corp.**, New York, the U. S. distributor. It is believed to be the first mechanical Btu meter developed exclusively for use with the heat pump.

**For More Free Data FILL IN CODE NO. on the Handy Return Card — Page 81**

## Blow-Off Valve

E-9 A new Unit Tandem blow-off valve for boiler blow-off pressures up to 665 psi, basic rated pressure 400 psi, has been developed by the **Yarnall-Waring Company**, Philadelphia 18, Pa.

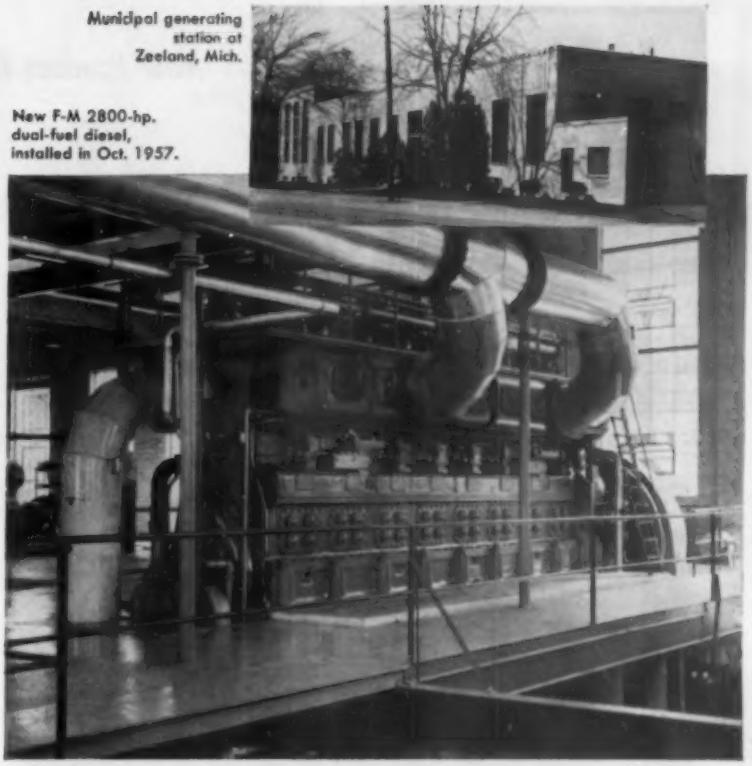
A forged steel block forms a common body for both the hard seat blowing valve and the seatless sealing valve. The hard seat blowing valve is of the Welbond type with an integral welded stellite seat. This design permits no leakage between seat and body which sometimes occurs with screwed-in seat rings. Valve stem is Type 303 stainless steel which gives adequate protection against pitting.

The sealing valve is of the well-known Yarway Seatless design, and parts are interchangeable with existing Type B Seatless Blow-Off Valves. The seatless valve gives positive closing with tight seal.

Medium Pressure Valves are available either with flanged or welding ends, right- or left-hand assembly. Yarway Bulletin B-435, Supplement A gives details.


Municipal generating station at Zeeland, Mich.

New F-M 2800-hp. dual-fuel diesel, installed in Oct. 1957.



*Even with poor load factors*

**new F-M dual-fuel diesel cuts fuel costs 21% for Zeeland plant!**

From July through October 1958, this 2800-hp. Fairbanks-Morse dual-fuel diesel produced 71 percent of the 4,502,000 kw. hr. generated at the Zeeland, Michigan municipal plant.

The big Model 31AD18 engine averaged 5.74 mills per kw. hr. for this period—bringing average fuel cost for the plant down to 6.52 mills from an average 8.24 the previous year, a 21 percent reduction in fuel costs! The figures are even more impressive when it is realized the F-M diesel was operating at poor load factors, often well below 50 percent. Despite this disadvantage, F-M dual-fuel design made the operation profitable—even with gas costing 45¢ a thousand cubic feet and pilot oil 12.5¢.

Outstanding economy and dependable performance of six Fairbanks-Morse diesels in the plant are paramount in Zeeland keeping residential rates among the lowest in Michigan—averaging 2.3¢ a kw. hr. for the last fiscal year. For information, write Fairbanks, Morse & Co., 600 South Michigan Avenue, Chicago 5, Illinois.

**FAIRBANKS-MORSE**

*a name worth remembering when you want the BEST*

DIESEL, DUAL FUEL AND GAS ENGINES • LOCOMOTIVES • ELECTRIC MOTORS • GENERATORS
PUMPS • SCALES • COMPRESSORS • MAGNETOS • HOME WATER SYSTEMS

# NEW!
## PENBERTHY ILLUMINATORS
*for Liquid Level Gages*

**58 WATT 3000 HOUR BULB**

**accurate readings**

**overall illumination**
**no glare**
**no blind spots**

Faster, more accurate liquid level readings are provided by Penberthy's new, improved, explosion-proof, dust-tight illuminators. 58 Watt Bulb (with medium screw base) gives higher light intensity for 4-times the life of ordinary illuminators. Exclusive rugged aluminum housing over bulb extends bulb life, offers better protection and simplifies relamping. Clear plastic wedge diffuses light over entire length of gage glass.

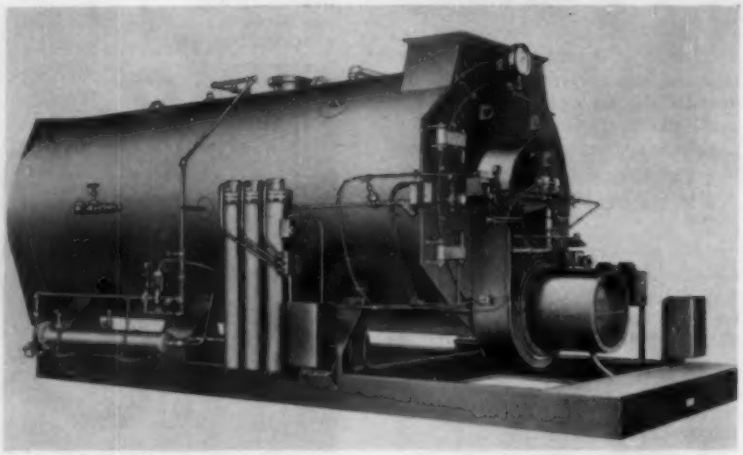
Illuminators are easily installed on present or new gages. Available in single or double sections, they are used in combination for gages with 3 or more sections. Approved by Underwriters' Laboratories for Class 1, Group C and D hazardous locations.

For further information on Penberthy Illuminators, liquid level gages and valves, write or phone. Ask for Catalog #36.

PENBERTHY

**PENBERTHY MANUFACTURING CO.**
*Division of Buffalo-Eclipse Corporation*
**1242 Holden Ave., Detroit 2, Michigan**


## *New Product Briefs (Continued)*



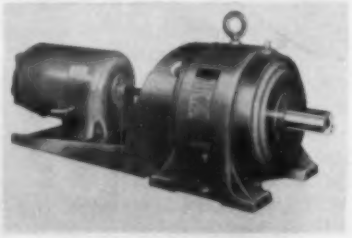
### 750 HP Package Boiler

E-10 A 750 hp package steam generator, manufactured by **Cyclotherm Div., National-U. S. Radiator Corp.,** Oswego, N. Y., delivers 26,000 lb of steam per hour at over 80% efficiency.

Designed for heavy oil or gas, the boiler (28′ x 9′6″ x 10′8″) can be adapted to burn either LP-Gas or light oil.

### Gear Reducer Combination

E-11 Combined gear reducer and gearshift drive unit, announced by **The Lima Electric Motor Co., Inc.,** Dept. 195, Lima, Ohio, gives 4 or 8 speeds on the output shaft of the gear reducer. Includes double and triple gear reduction units with motor capacities rated from 1 to 10 hp.



By moving the shift lever on the gearshift drive into one of four positions, four different output shaft rpms are obtainable on the gear reducer. By using a two speed motor in the gearshift drive eight different speeds are obtained on the gear reducer output shaft.

Combination is constant-torque, 3 or 2 phase, 60 cycle, 208, 220/440 or 550 volts. Special voltages and frequencies, along with mechanical modifications, are available. Possible to furnish constant hp output in all four speeds with selection of proper gear reducer.

### Current Transformers

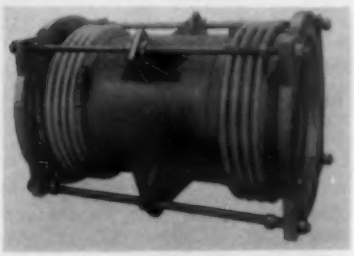
E-12 Two improved 600-volt, buytl - molded current transformers with significantly increased cable capacity, color-coded nameplates for ready identification of current ratings and a new, versatile mounting arrangement have been announced by the **General Electric Co.,** Schenectady 5, N. Y.

### Pneumatic Grinders

E-13 A new line of portable pneumatic grinders by **Thomas C. Wilson, Inc.,** 21-11 44th Ave., Long Island City, N. Y. will handle grinding, buffing and wire wheel work in general industrial operations. Speeds range from 3100 to 12,000 rpm. Wheel sizes range from three to eight in. in diameter. Lever, straight, or grip-type handle can be specified.

## Universal Expansion Joints

E-14 New line of bellows-type expansion joints manufactured by **Zallea Brothers,** 815 Locust St., Wilmington 99, Del., protect power and process piping systems by absorbing axial movement, lateral deflection and angular rotation, either singly or in any combination, without imposing any pressure thurst on piping or equipment.



In standard sizes from 3 in. to 72 in. diameter and are supplied with one of three different types of bellows — non equalizing, self equalizing or HyPTortoroidal. Standard units available to pressures up to 2500 psi and temperatures from minus 320 F to 1600 F. Special units are available for more severe conditions.

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## Vibrometer

E-15 **The Korfund Company,** 48-48G 32nd Place, Long Island City 1, N. Y. has announced the availability of the Korfund Reed Vibrometer, a light, compact, hand-held instrument of a high order of accuracy. It is used for measuring vibration frequency and amplitude, determining the direction of maximum transmitted disturbances, locating the cause of unwanted noise due to resonant vibration, and measuring the speeds of rotating equipment where shafts or rotors are not readily accessible by simply placing its probe against the machine housing. In addition, it can be used to analyze component frequencies of complex vibrations.


OSCILLATORS
AIR CIRCULATORS
EXHAUST

FANS

BY EMERSON-ELECTRIC

*low initial cost*
*low operating cost*

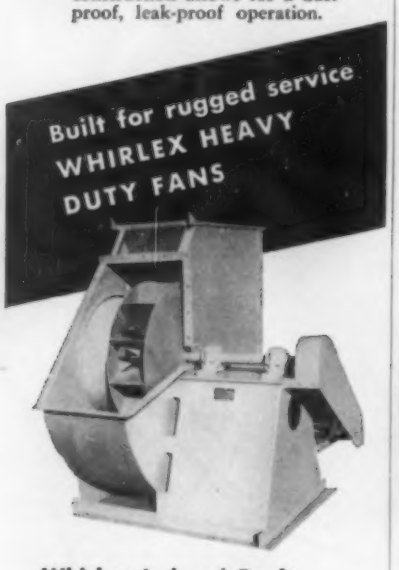
You save money when you install quiet, efficient fans — oscillators, air circulators and both belt-drive and direct-drive exhaust fans — backed by the Emerson-Electric famous factory-to-user guarantee.

***WRITE FOR FREE CATALOG NO. F285***

**EMERSON ELECTRIC** of St. Louis • *Since 1890*

8100 FLORISSANT AVE. • ST. LOUIS 21, MO.

**Whirlex Forced Draft**
heavy duty fans are designed for service in all types of boiler and industrial applications. Special design airfoil impellers provide maximum static efficiency. All-welded housing construction allows for a dust-proof, leak-proof operation.

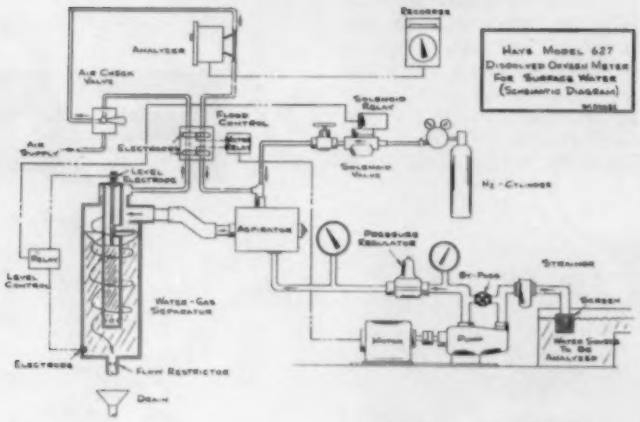



**Whirlex Induced Draft**
heavy duty fans are available with either straight or evase type self supporting stacks. Special shaft cooling sleeves allow for the efficient use of air cooled bearings. Water cooled bearings can be furnished if desired.

*Write for complete information on these and other types of Whirlex industrial fans.*

**Fly Ash Arrestor Corp.**
201 N. 1st Street
BIRMINGHAM, ALA.
WHIRLEX


# New Product Briefs (Continued)




## Dissolved Oxygen Meter

**E-16** A Dissolved Oxygen Meter which automatically analyzes and continuously records dissolved oxygen in surface waters is now available from **The Hays Corporation,** Michigan City, Indiana.

The analyzer consists of three basic units: Contact Sampler, Magno-Therm Analyzer, and Universal Recorder. The Contact Sampler is located on a single detachable plate mounted on the rear of the Magno-Therm Analyzer. With maintenance checking in mind, all low pressure interconnecting tubing is of clear plastic to allow ready observation of sample flow. The analyzer utilizes the paramagnetic characteristic (attraction by a magnetic field) of oxygen in its operation. With no moving parts and no reference gas or liquid required for operation and its measuring resistors sealed in glass, this analyzer is practically maintenance - free. The recorder shows dissolved oxygen content of the water in percent of saturation, standard range being 0-150%.

## Control Valve

**E-17** A multi-port, 3- and 4-way, flat-disc type control valve that allows precise throttling has been developed by **W. H. Nicholson and Co.,** 12 Oregon St., Wilkes-Barre, Pa.

The new valve, designated the Nicholson Model 300, actuates single- or double-acting cylinders and may be used with air, water, hydraulic fluid or oil as the pressure medium at operating pressures of 300 psi. The valve provides accurate, repeatable control of such equipment as presses, hoists, gates, doors, lifts, clutches, brakes, chucks, molding machines, etc.

## Field Compressor

**E-18** A new turbocharged model has been added to the line of 2-cycle packaged field compressors of **Clark Bros. Co.,** Olean, N. Y. Designed for maximum horsepower per cubic inch of displacement, the Model TMB-8 with four compressor cylinders is rated at 525 bhp. It serves as a companion to the larger TMB-10 which has five compressor cylinders and is rated at 660 bhp. The scavenging load is removed when the compressor reaches rated load conditions. Power formerly used for scavenging is now used to pump gas.

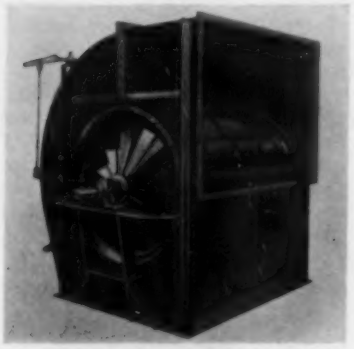
Furnished as a complete package, the unit includes gas engine driven compressor, radiator, scrubbers, starting air compressor, and other accessories mounted on a steel skid. It is also available as a stationary unit.

**For More Free Data FILL IN CODE NO. on the Handy Return Card — Page 81**

## Mechanical Draft & Heavy Duty Fans

E-19 New fan equipment has been designed by **Clarage Fan Co.**, Kalamazoo, Mich. to secure high efficiency and stable performance characteristics, particularly in mechanical draft and heavy-duty applications.

The airfoil, backward curved blades are of one-piece die formed construction, welded to the rim and backplate. Internal struts inside the hollow section are provided in blades of fans for higher tip speed classes. Dynafoil wheel built with 12 aerodynamically shaped blades which, in combination with the streamlined contour of the inlet, permits a continuously smooth flow of air through the fan.

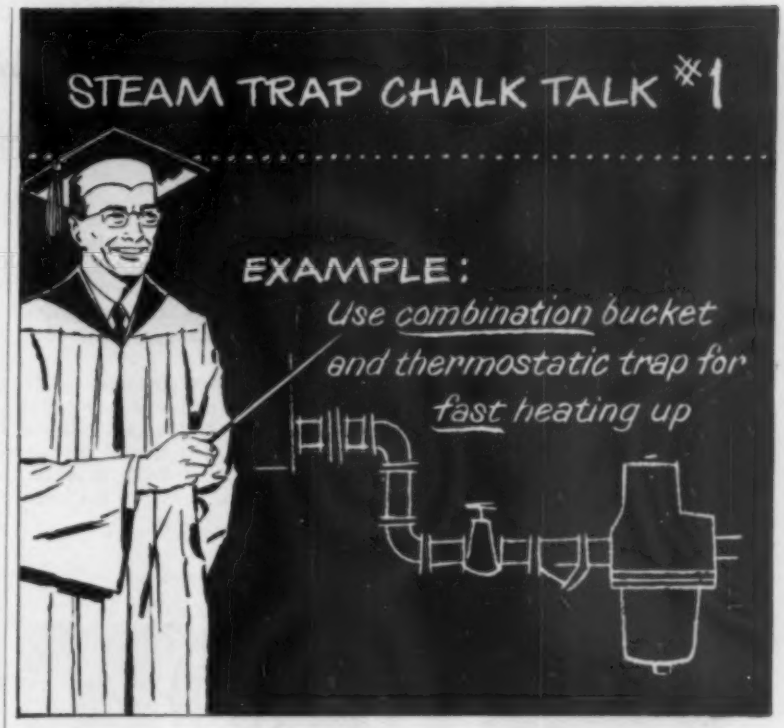


The fans are offered in 13 sizes for mechanical draft and in Classes II, III, and IV for heavy-duty industrial applications. Also well adapted to conduit type air conditioning systems and tunnel ventilation.

## High Tensile Electrode for Structural Steels

E-20 New type of high strength welding electrode for mild steel, low carbon and low alloyed steels has been developed by **Eutectic Welding Alloys Corp.**, 40-40 172nd St., Flushing 58, N. Y. EutecTrode Super 110 (AC-DC) combines unusually high strength of over 110,000 psi with elongation to eliminate any cracking tendency.

Electrode provides ferritic weld metal of 100% joint efficiency and is preferred for welding pressure vessels, tanks and other assemblies requiring extensive post heat treatment. Available in 3/32", ⅛", 5/32" and 3/16" diameters.


***How proper trap selection increases heat transfer efficiency 35%***

- It is of the utmost importance that the *correct* design of trap be used for each application. Standardizing on one design of trap for all applications reduces heat transfer rates up to 35%. As an example, for extremely fast heating up, a combination inverted bucket and thermostatic trap will shorten heat-up periods to 2½ minutes, eight times faster than conventional inverted bucket traps.

For other sound selection recommendations, send for Anderson's new engineering catalog, "How to Select Steam Traps". Here you will find valuable tips on which of the four basic types of traps—inverted bucket, thermostatic, combination or float—to use for any installation. Send for your complimentary copy. Mail the coupon today.

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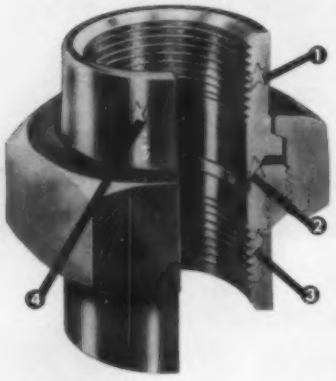


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3. **More than adequate** wall thicknesses give you Catawissa's 3-to-1 Safety Factor (3000-lb. service, 9000-lb. test; 6000-lb. service, 18000-lb. test)!

4. **Round, straight barrels** for fast wrenching. No uneven or tapered surfaces to cause wrench slips or wrench locking!

Catawissa Perfect Seal Pipe Unions are made by Union Specialists from 80,000 lb. tensile strength steel (ASTM Spec. A-105-55T, Grade II). Steel forgings from our own forging mill are closely checked for imperfections . . . and finishing on modern, automatic machines with close inspection during and after production give you pipe unions second to none!

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# *New Product Briefs (Continued)*

## Dryseal Fittings

E-21 "Dryseal" Threaded NPTF Pipe Fittings, which have proven to eliminate "leakers," are available from **Pipe Fittings, Inc.**, Wellington, Ohio. They are made of malleable ductile Normalized air furnace iron which increases impact resistance from 33% to 40%.

The fittings are in pipe sizes ⅛"-27 through 2"-11½ in the Hot Dip galvanized finish plated with Brass Dichromate or in a special process dull zinc rust-proof finish — available at the same prices as the ordinary threaded fittings.

## Dyna-Switch

E-22 A new addition to the popular Dyna-Switch line has been announced by **W. C. Dillion & Company, Inc.**, 14620 Keswick St., Van Nuys, California, offering complete protection against accidental overloading of hoists and cranes by shutting off the current.

This improved version has the sensitive control switches housed in a heavy metal junction box, sealing out rain, dirt, moisture or dust. The housing also accommodates spliced cable ends which are fed into this box through spring suspension cable fittings with locking collars.

## Silver-Bearing Brazing Alloy

E-23 A highly versatile silver-bearing brazing type alloy, EutecRod 1801-Super, providing lower melting temperature, higher fluidity and the highest electrical conductivity, has been developed by **Eutectic Welding Alloys Corp.**, 40-40 172nd St., Flushing, N. Y.

The alloy has exceptional wetting and thin flowing properties. It will flow freely through long laps and complicated contours of copper, brass, bronze, steel and stainless steel, or dissimilar combinations. Due to the controlled plastic range of the alloy, the user is afforded greater versatility on lap, flange, tee and butt joints.

The unique chemistry of EutecRod 1801-Super provides the user with an alloy melting at a low 1135 F, giving joints of up to 80,000 psi tensile strength, that are highly resistant to corrosion and very high in electrical conductivity.


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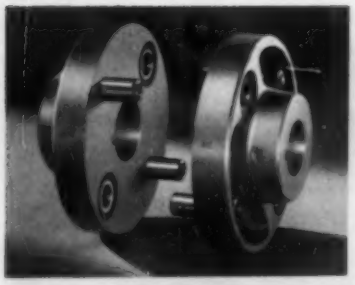

## Flexible Couplings

E-24 A new line of Series 400 Flexible Couplings for use on direct-driven machinery where torque is not excessive in relation to shaft diameter, is announced by the **Ajax Flexible Coupling Company, Inc.**, Westfield, New York.

The four studs and sleeve bearings provide positive, resilient drive. No lubrication is required.

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## Compressed Air Dryers

E-25 Large volume compressed air dryers by **Van Products Company**, 5869 Swanville Rd., Erie, Pa., are designed with capacities up to 3000 cfm to handle compressor output up to 600 hp.

Units extract both water and micronic particles and dry the air to low dewpoint quality in volume sufficient to protect all plant operations including critical controls, tools, and processes against damage by corrosion, pollution, dilution, freezing, etc.

Dryers use a triple-action desiccator developed to operate without heat, regeneration, regulation, volume loss, carry-over or appreciable pressure drop.


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## . . . gives most accurate temperature control

Applied in cooling industrial machines or processes to temperatures approaching the ambient wet-bulb, the NIAGARA *Aero* HEAT EXCHANGER is independent of any more than a nominal water supply or disposal. The coolant system is a closed one, free from dirt and maintenance troubles.

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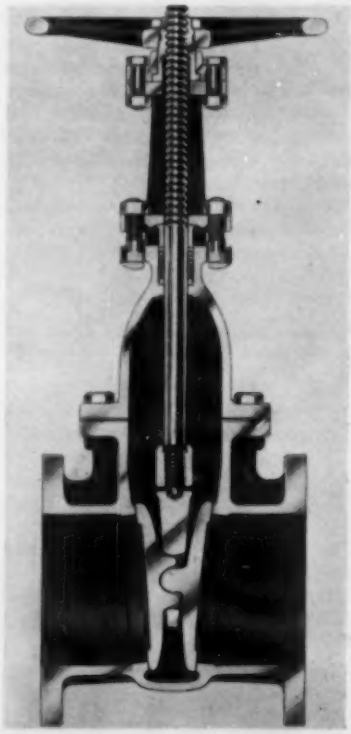
**NIAGARA BLOWER COMPANY**

Dept. SP-4, 405 Lexington Ave., New York 17, N.Y.

*District Engineers in Principal Cities of U. S. and Canada*


## Gate Valves for Corrosive Conditions

E-26 A new stainless steel split wedge gate valve by **Jenkins Bros.**, Room 34, 100 Park Ave., New York 17, N. Y. automatically adjusts to the tapered seating surfaces. The discs revolve freely in the wedge carrier, producing a self-cleaning action on the seat which reduces galling and seizing.



A 2-piece packing gland design eliminates binding of the follower when gland bolts are tightened unevenly. The valve features Chevron-type Teflon packing, through-port body design, and end flanges which conform to MSS SP-42 specifications.

## Vertical Motors

E-27 **The Louis Allis Co.**, Dept. P, Milwaukee 1, Wis., has available all-weather Vertical Hollow Shaft Motors in ratings of 1 to 30 horsepower. These climatized motors provide indoor and unprotected outdoor service on shallow or deep-well turbine pump applications for irrigation, petroleum product handling, chemical pumping, power plant condenser cooling and other industrial installations.

## Instantaneous Heaters

**E-28** A new line of Ross Instantaneous Heaters has been introduced by **American-Standard**, Industrial Division, Detroit 32, Mich.

Featured is an exclusive, extra-large steam entrance area beyond the tube bundle, that prevents tube damage by impingement, prolonging tube life. Standard construction consists of rugged steel shells, cast iron bonnets, and seamless, copper alloy U-tubes. Designated Type W-100, the units are of compact, simplified design, with removable, pull-thru tube bundles.

Available in 128 sizes with two and four pass arrangements, nominal tube lengths up to 10 ft and shell diameters through 20 in., Ross Instantaneous Heaters are readily available for practically every water heating requirement: service water, boosters, space heating convertors, radiant heating panels, snow melting equipment, swimming pools, storage towers and process work. Specially engineered units are built to handle other fluids.

## Silicon Rectifiers

**E-29** The availability of Silicon a-c to d-c Power Rectifiers has been announced by **Syntron Company**, 110 Lexington Ave., Homer City, Pa.

This new SN-60 series, designed for intermediate power applications is a compact, highly efficient rectification medium with exceptionally good electrical and mechanical characteristics. In addition, these Silicon Rectifiers offer the economy of extra-long operation, even under strenuous conditions.

## Oil Reclaimer

**E-30** The 600-X Hilco Hyflow Oil Reclaimer has been designed by **The Hilliard Corporation** of Elmira, New York for full-flow purification of lubricating and sealing oil on high vacuum pumps with a total oil circulating rate of 500 gallons per hour.

Capable of delivering 600 gallons per hour of vacuum pump lubricating and sealing oil, it is equipped with duplex inlet strainers to protect pumps, inlet and outlet pumps, and electrically heated vacuum vaporizer with three banks of thermostatically controlled heaters, and duplex fullers earth filters in the outlet line.

Outstanding features include utilization of two sets of inlet and outlet oil pumps, centrally located graphic control panel with automatic electric controls and alarm system, single percolation tower-type fullers earth filters which may be operated either in parallel or individually, an outlet flow alarm system, and an automatic recirculation system on the vaporizer which will permit only dry purified oil to be delivered to the vacuum pump charging system.

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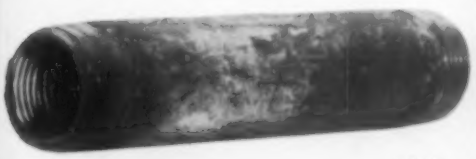

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